UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

MARCH, 1885.

PREPARED UNDER THE DIRECTION OF
BRIG. & BVT. MAJ. GEN'L W. B. HAZEN,
CHIEF SIGNAL OFFICER OF THE ARMY,

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1885.

List of merchant marine steam and sailing vessels from which International Simultaneous Meteorological reports were received at the Office of the Chief Signal Officer, U. S. Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of March, 1885.

Name of vessel.	Observers.
Allan Line.	
Br. s. s. Circassian	Capt. Wm. Richardson.
Grecian	C. E. Le Gallais.
Norwegian	John G. Stephen.
Prussian	Alex. McDougall.
Scandinavian	John Park.
Siberian	R. P. Moore.
American Line.	
Br. s. s. British Crown	Geo. C. Burton.
British Princess	E. H. Freeth.
Am. Illinois	Geo. H. Dodge.
Br. Lord Clive	P. Urquhart.
Anchor Line.	
Br. s. s. Australia	Alex. McRitchie.
Devonia	Hugh Young.
Elysia	James Brown.
Ethiopia	John Wilson.
Furnessia	L. Garrick.
Trinacria	Geo. Mitchell.
Anglo-Australian S. S. Co.	
Br. s. s. Port Phillip	Geo. Dulling.
Atlas Line.	
Br. s. s. Ailsa	Jno. W. Sansom.
Alvo	David Williams.
Span. Andes	R. de Echevarrieta
Athos	Horatio Low.
Bristol-City Line.	
Br. s. s. Lirudaff City	T. L. Weiss.
California and Mexican S. S. Co.	
Am. s. s. Newbern	E. T. Rogers.
Canada Shipping Company.	
Br. s. s. Lake Huron	Wm. Bernson.
Lake Manitoba	Wm. Stewart.
Lake Nepigon	H. Campbell.
Cunard Line.	
Br. s. s. Aurania	W. H. P. Hains.
Bothnia	T. Roberts.
Catalonia	Alex. McKay.
Cephalonia	Henry Walker.
Gallia	M. Murphy.
Scythia	P. Whealan.
Edward Carr's S. S. Line.	
Ger. s. s. Australia	G. Frank.
California	O. Winckler.
Furness Line.	
Br. s. s. Durham City	M. P. Lund.
Stockholm City	R. Doyle.
General Trans-Atlantic Steamship Co.	
Fr. s. s. Canada	G. S. de Kersabiec.
Labrador	Périer d'Hauterive.
St. Laurent	M. de Jousselin.
Guion Line.	
Br. s. s. Arizona	Sam. Brooks.
Wyoming	C. L. Rigby.
Hamburg-American Line.	
Ger. s. s. Bohemia	R. Kariowa.
Gellert	W. Kühlewein.
Hammonia	H. F. Schwensen.
Lessing	B. Voss.
Moravia	O. Pexoldt.
Rhaetia	H. Vogelgesang.
Rugia	A. Albers.
Wieland	C. Hebich.
Westphalia	H. Barends.
Inman Line.	
Br. s. s. City of Berlin	Francis S. Land.
City of Montreal	Arthur Redford.
City of Richmond	A. W. Lewis.
Johnson Line.	
Br. s. s. Nessmore	John Inch.
Lamport & Holt's Steamship Company.	
Br. s. s. Hevelius	John Carroll.
Leyland Line.	
Br. s. s. Bulgarian	E. Parry.
Venetian	W. H. Trant.
Virginian	M. Fitt.
Liverpool, Brazil and River Plate Steam Navigation Company.	
Br. s. s. Olbers	James Clarke.
Mallory Line.	
Am. s. s. Colorado	Sam. Risk.
Lampasas	M. B. Crowell.
San Marcos	A. C. Burrows.
Mediterranean and New York S. S. Co.	
It. s. s. Archimede	Domenico Viola.
Indipendente	P. Pirandello.
Mis. & Dominion S. S. Co.	
Br. s. s. Brooklyn	Geo. S. Dale.
Ontario	W. P. Couch.
Oregon	H. C. Williams.
Toronto	Jas. McAuley.
Monarch Line.	
Br. s. s. Assyrian Monarch	John Harrison.

Name of vessel.	Observers.
Morgan's La. & Texas R. R. & S. S. Co.	
Am. s. s. Chalmette	Capt. Robt. B. Quick.
National Line.	
Br. s. s. Canada	Wm. Pearce.
Egypt	J. Sumner.
Erin	John Robinson.
France	Wm. Pearce.
Holland	Geo. Cochrane.
Spain	Jas. Sumner.
New York and Cuba Mail S. S. Co.	
Am. s. s. Cienfuegos	C. M. Faircloth.
N. Y., Havana & Mexican Mail S. S. Co.	
Am. s. s. City of Alexandria	J. W. Reynolds.
North German Lloyd Steamship Co.	
Ger. s. s. America	G. Meyer.
Donau	R. Ringk.
Eider	W. Willigerod.
Elbe	F. Hamelmann.
Ems	Ch. Leist.
Fulda	O. Heimbruch.
Habsburg	Fr. Pfeiffer.
Hermann	H. Baur.
Hohenzollern	A. Meier.
Main	H. Christoffers.
Neckar	R. Busius.
Nürnberg	A. Jaeger.
Salier	C. Wiegand.
Strassburg	H. Heincke.
Werra	J. Barre.
Weser	H. Bruns.
Ocean Steamship Company.	
Am. s. s. City of Augusta	K. S. Nickerson.
Occidental & Oriental S. S. Company.	
Br. s. s. Oceanic	John Metcalf.
Oceanic Steamship Company.	
Am. s. s. Alameda	H. G. Morse.
Mariposa	H. M. Hayward.
Oregon Railway and Navigation Co.	
Am. s. s. City of Chester	Thomas Wallace.
Columbia	Fred. Bolles.
Oregon	E. Polemann.
Pacific Coast Steamship Company.	
Am. s. s. Geo. W. Elder	H. Ackley.
Orizaba	John N. Ingalls.
Santa Rosa	Chas. B. Johnson.
Pacific Mail Steamship Company.	
Am. s. s. Acapulco	W. G. Shackford.
Br. Australia	R. C. Ghest.
Am. City of New York	Robt. R. Searle.
City of Peking	G. G. Berry.
City of Rio Janeiro	Wm. B. Cobb.
City of Sydney	H. C. Dearborn.
City of Tokio	Com. Jefferson Maury.
Colima	Capt. W. B. Seabury.
Granada	M. Connolly.
San Blas	Thos. Chapman.
Quebec Steamship Company.	
Br. s. s. Muriel	G. S. Locke.
Orinoco	Jas. S. Garvin.
Red "D" Line.	
Am. s. s. Caracas	W. M. Hopkins.
Red Star Line.	
Belg. s. s. Belgenland	W. A. Beynon.
Nederland	Allen J. Griffin.
Pennland	Rud. Weyer.
Rhynland	J. C. Jamison.
Switzerland	H. Buschmann.
Waesland	J. Ueberweg.
Westernland	W. G. Randle.
Rotterdam Line.	
Dtch. s. s. Edam	J. H. Taat.
P. Caland	T. H. Bonjer.
W. A. Scholten	G. Bakker.
Royal Mail Steam Packet Company.	
Br. s. s. Gaudiana	C. W. Hanslip.
Royal West Indian Mail Steamship Co., of Amsterdam.	
Dtch s. s. Oranje Nassau	J. A. J. Lacrooy.
State Line.	
Br. s. s. State of Georgia	G. Moodie.
State of Nebraska	A. G. Brace.
State of Nevada	Jno. A. Stewart.
Thingvalla Line.	
Dan. s. s. Geiser	F. V. Schierbeck
Thingvalla	S. T. H. Laub.
U. S. and Brazil Mail S. S. Co.	
Am. s. s. Finance	Ch. Off. James Lord.
Warren Line.	
Br. s. s. Iowa	Capt. Samuel Walters.
White Star Line.	
Br. s. s. Adriatic	H. Parsell.
Baltic	H. E. Bence.
Britannic	H. Perry.

Name of vessel.	Observers.
White Star Line.—Continued.	
Celtic	Capt. Benj. Gleadell.
Germanic	C. W. Kennedy.
Republic	P. J. Irving.
Wilson Line.	
Br. s. s. Chicago	J. W. Jones.
Galileo	Richard Potter.
Lepanto	Wm. Abbott.
Marengo	J. H. Malet.
Otranto	F. Kerr.
Rosario	Lieut. Rogers, R. N. R.
Winsor Line.	
Am. s. s. Norman	Capt. H. W. Googins.
Saxon	S. W. Snow.
Miscellaneous.	
Br. s. s. Amethyst	Robt. Bennington
Biela	Fred. Graham.
Bracadale	E. Weddall.
Castleford	C. A. Sibthorpe.
Chiswick	Edw. Leighton.
Edith Godden	John H. Bennett.
East Anglia	W. H. Thomas.
Belg. Hipparchus	Wm. Kelly.
Br. Kairus	Thos. Liddle.
Matthew Bedlington	Thos. Kirby.
Monte Rosa	W. Thos. Irving.
North Anglia	C. N. Mumford.
Ocean King	Geo. Denham.
Picqua	Wm. Clayton.
Strathleven	C. W. Pearson.
Sailing vessels.	
Am. bg. Abbie Clifford	David W. Storer.
sc. Abbie H. Gheen	W. W. Gheen.
Ger. sp. Agra	A. Högemann.
Am. Armenia	E. L. Carter.
bg. Atlanta	H. S. Aldrich.
Br. bk. Aureola	Geo. W. Turner.
Am. bg. Belle of the Bay	R. O. Welton.
Ger. bk. Betty	S. Wohlmuth.
Am. Charles Stewart	Horace Atwood.
Br. Corisande	Daniel Thoms.
Ger. sp. Cornelius	H. Windhorst.
Derby	B. Fortmann.
bk. Diamant	L. Haesloop.
Br. sp. E. J. Spicer	Lewis Spicer.
Am. sc. Ettie H. Lister	Smith D. Mason.
Br bk. Exile	Geo. J. Pearce.
Am. sc. Florence Rogers	Jas. S. F. McLeod.
Br. bk. George Davis	Thos. Macumber.
Am. sc. George W. Lochner	J. C. Wiltbank.
Governor Hall	John Craig, Jr.
Henry Waddington	W. H. Megee.
Ger. sp. Ida	W. Schneider.
Am. bk. Idaho	W. S. Richardson.
sc. Jennie R. Morse	A. D. Colcord.
Ger. bk. Leocadia	John Stopff.
Am. sc. Maggie Abbott	D. C. McIntosh.
bg. Mary Fink	Dan'l B. Darrah.
sc. Mary Nowell	Wm. M. Lank.
Maude Snare	E. W. Snare.
Nelson Bartlett	Samuel Watts.
Norena	A. B. Chase.
Ger. bk. Orpheus	G. Meyer.
Br. Paladin	J. A. Bettencourt.
Nor. Qvos	Gunder Olsen.
Am. sp. Ringleader	J. C. Entwisle.
sc. Stephen Bonnett	William Douglas.
Br. bk. Strathome	A. W. Fleming.
Am. sc. Thomas Clyde	Alfred J. Biddle.
Nor. bk. Tros	Severin Brager.
Ger. sp. Union	H. Fokken.
It. bk. Vincenzo Accame	A. V. Lavagna.
Nor. Vikingen	J. C. Andersen, Jr.
Am. sc. Viola Reppard	Lewis Ogier.
Ger. bk. Western Chief	Fr. Sander.
Br. bk. Winifred	N. P. Dutton.
"New York Herald Weather Service."	
Am. s. s. Acapulco	W. G. Shackford.
Br. Adriatic	H. Parsell.
Am. Advance	Jas. R. Beers.
Br. Alene	E. J. Selders.
Belg. Belgenland	W. A. Beynon.
Br. Britannic	H. Perry.
Am. Caracas	W. M. Hopkins.
Br. Carn Marth	W. C. Boynes.
Celtic	Benj. Gleadell.
Am. Chalmette	R. B Quick.
City of Alexandria	J. W. Reynolds.
Br. City of Chicago	Fred. Watkins.
City of Richmond	A W. Lewis.
City of Montreal	Arthur Redford.
Am. Colon	S. G. Porter.
Ger. Eider	W. Willigerod.
Ems	Ch. Leist.
Br. Gallia	M. Murphy.
Dan. Geiser	F. V. Schierbeck.
Ger. Lessing	B. Voss.
Belg. Nederland	A. J. Griffin.
Dtch. P. Caland	T. H. Bonjer.
Br. Republic	P. J. Irving.
Am. San Marcos	A. B. Conner.
Saratoga	John McIntosh.
Dtch. Schiedam	J. de Harnecourt
Br. State of Nebraska	A. G. Brace.
Belg. Switzerland	H. Buschmann.
Fr. St. Laurent	M. de Jousselin.
Belg. Waesland	J. Ueberweg.
Br. Wisconsin	Edw. Bentley.
Wyoming	Chas. L. Rigby.

MONTHLY WEATHER REVIEW.

VOL. XIII. WASHINGTON CITY, MARCH, 1885. No. 3.

INTRODUCTION.

This REVIEW contains a general summary of the meteorological conditions which prevailed over the United States and Canada during March, 1885, based upon the reports from the regular and voluntary observers of the Signal Service and from co-operating state weather services.

Descriptions of the storms which occurred over the north Atlantic ocean during the month are also given, and their approximate paths shown on chart i.

The most noteworthy meteorological features of the month were the marked departures from the normal temperature and precipitation.

The month was exceptionally cold in the districts east of the Mississippi river, and also in the west Gulf states and southern slope. Except in Florida and Tennessee, the mean temperatures in the districts east of the Mississippi averaged more than 6° below the normal; the departures were greatest in the lake region where they exceeded 9°. In the upper Missouri valley, Rocky mountain regions, and on the Pacific coast the month was warmer than the average; in these districts the temperature averaged from 2° to 6° above the normal.

The precipitation was deficient over nearly the whole country, the departures from the average being unusually large in the districts east of the Mississippi and on the Pacific coast.

On chart i. are traced the paths of the centres of eleven atmospheric depressions which are described under "Areas of low barometer;" the average number of depressions charted for March during the last eleven years is 12.5.

But few local storms occurred during the month, and those reported were not unusually severe.

During the night of the 15–16th an auroral display was observed in nearly all the northern districts and as far southward as Nashville, Tennessee.

In the preparation of this REVIEW the following data, received up to April 20th, 1885, have been used, viz.: the regular tri-daily weather-charts, containing data of simultaneous observations taken at one hundred and twenty-nine Signal Service stations and nineteen Canadian stations, as telegraphed to this office; one hundred and sixty-nine monthly journals and one hundred and sixty-nine monthly means from the former, and nineteen monthly means from the latter; two hundred and ninety-eight monthly registers from voluntary observers; forty-six monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs, furnished by the publishers of "The New York Maritime Register;" monthly reports from the New England Meteorological Society, and from the local weather services of Alabama, Georgia, Illinois, Indiana, Louisiana, Minnesota, Missouri, Nebraska, Ohio, and Tennessee, and of the Central Pacific Railway Company; trustworthy newspaper extracts; and special reports.

ATMOSPHERIC PRESSURE.

[*Expressed in inches and hundredths.*]

The distribution of mean atmospheric pressure for March, 1885, determined from the tri-daily telegraphic observations of the Signal Service, is shown by the isobarometric lines on chart ii.

An area of barometric maxima occupies the northern and central Rocky mountain districts where the mean pressures range from 30.2 to 30.28; an area of barometric minima is shown over New England and the Maritime Provinces, where the barometric means vary from 29.9 to 29.96. The mean pressure is above 30.1 over nearly the entire country, the isobar for 30.1 being traced from western Lake Superior to the south Atlantic states and thence along the southern borders of the country to the Pacific coast.

Compared with the mean pressure for the preceding month there has been an increase (instead of the usual decrease which occurs in March) in all parts of the United States, except on the middle Pacific coast, where the barometric means are from .04 to .06 below those for February. The increase is most marked over the Rocky mountain districts and the north Pacific coast, where it varies from .10 to .18. In all districts east of the Rocky mountains the mean pressures are from .04 to .10 higher than those for February.

Compared with the normal pressure for March an increase is shown over nearly the whole country. At Alpena, Michigan, a slight deficiency occurs, but at all other stations the mean pressure is above the normal. Over an extensive area, reaching from the west Gulf states to the north Pacific coast, the departures exceed .10. The greatest departures are as follows: Olympia, Washington Territory, and Santa Fé, New Mexico, .15; Fort Apache, Arizona, .16.

BAROMETRIC RANGES.

The monthly barometric ranges for the several stations are given in the table of miscellaneous meteorological data; they were greatest in the northern districts to the east of Dakota, and least at the Rocky mountain stations, in Florida, Rio Grande valley, and California. The smallest ranges are .33 at Fort Apache, Arizona, and .38 at Fort Maginnis and Helena, Montana; the largest are 1.29 at Saint Vincent, Minnesota; 1.30 on the summit of Mount Washington, New Hampshire; and 1.33 at Eastport, Maine.

AREAS OF HIGH BAROMETER.

During the month seven areas of high barometer passed over the districts east of the Rocky mountains. The pressure in nearly all districts during the first week of the month remained somewhat high, and it was not until the 7th that any well-defined area made its appearance.

I.—This area first appeared in Idaho during the afternoon of the 7th, moving slowly southeastward. The area, though well-defined and of considerable magnitude, had but little influence on the temperature, which, at the time the area was first observed, was in nearly all districts abnormally low. The fall in temperature accompanying the movement of the area

was from 10° to 20°. At midnight of the 8th the centre of greatest pressure was in the Gulf states, and by the afternoon of the 9th the area had passed into the Gulf of Mexico, the direction of movement being directly southeastward.

II.—After the passage of low area ii. the barometer rose rapidly at stations in Manitoba, the change in eight hours being from .30 to .40. The afternoon report of the 9th showed that the area of high pressure covered the western portion of the upper lake region, the extreme northwest and the northern portions of the upper Mississippi and Missouri valleys. In the extreme northwest the temperature in twenty-four hours, fell from 20° to 30°. Continuing its southeasterly movement on the morning of the 10th, the area covered the lake region, the Ohio, upper Mississippi and Missouri valleys, and the barometer began to rise rapidly in the middle Atlantic states. At this report the centre of greatest pressure was in Manitoba and the temperature at Prince Arthur's Landing on Lake Superior, stood —13°, being a fall of 44° in twenty-four hours. The fall at neighboring stations in the upper lake region was about 30°. On the morning of the 11th, the centre of the area was in the middle Atlantic states, where the temperature had fallen 10° to 20°; the greatest change in the temperature was in the Saint Lawrence valley, averaging from 20° to 30°. During the afternoon of the 11th, the area passed into the Atlantic. Its movement, in connection with low area ii. caused the high westerly winds which prevailed on the Atlantic coast from the 9th to 11th.

III.—The midnight report of the 11th showed the presence of this area in the extreme northwest. Its movement was almost identical with that of number ii., viz: to the eastward. It was central at midnight of the 12th in the Saint Lawrence valley, where the temperature fell about 20° in twenty-four hours. At the same hour it made its appearance. low area iii. developed in the Indian Territory. The movement of this high area over the northern districts prevented the depression taking the northeasterly course usual with storms which originate in that section of the country. Passing over New England and the middle Atlantic states, causing a fall in temperature of about 20°, the area disappeared on the 13th. High northeasterly winds prevailed on the Atlantic coast during the passage of this high area in connection with the movement of low area iii.

The minimum temperature for the month at several stations in the lower lake region and New England occurred on the 13th. At Oswego, New York, a temperature of —9.6 occurred, which is the lowest recorded in March since 1872, when a temperature of —11° occurred.

IV.—The afternoon report of the 15th showed the barometer to be rising in the extreme northwest, with a decided fall in temperature in that district. On the morning of the 16th the centre of greatest pressure was in Manitoba. In the lake region and upper Mississippi valley the temperature had fallen in twenty-four hours between 20° and 25°, and in the Missouri valley about 30°. This area followed immediately after low areas iv. and v. At 7 a. m. of the 17th the centre was in the Missouri valley, the area having moved in an almost direct southerly course. After this report the pressure diminished considerably, and the area was last observed in northern Texas at midnight of this date. The greatest change in temperature occurred during the movement of this high area in the western and southern districts, amounting to about 20°, but its influence was felt in all districts as far east as the New England states, causing a reduction in temperature of from 10° to 15°. In the extreme northwest, upper Mississippi and Missouri valleys, and middle slope the minimum temperatures for the month occurred on the 16th and 17th, during the prevalence of this high area.

V.—This area was first observed on the afternoon of the 18th in Montana. On the morning of the 19th it was central in Manitoba, accompanied by a fall in temperature of 20°. It moved southeastwardly until it reached the middle Atlantic states, where it remained for a short while stationary, and on the 20th united with, and formed a part of high area number vi. The cold wave accompanying this area affected all districts except the Gulf states, the reduction in temperature being about 15°.

VI.—During the afternoon of the 20th and following immediately after the development and subsequent movement of low area vi. the barometer at stations in the extreme northwest rose rapidly, and by midnight of that date there appeared a well-defined area of high pressure with its centre north of Manitoba. The temperature in the Missouri valley, though low for the month, continued to fall, and was, on the morning of the 21st, about 10° lower than at the morning report of the 20th. During the 21st the area gradually extended and covered all districts except the south Atlantic states, where the depression was then central. The cold wave accompanying the rapidly rising barometer in rear of the low area caused the temperature to fall about 20°, the greatest change being in the Gulf and south Atlantic states. On the morning of the 22d the centre of greatest pressure was in Manitoba, and on the 23d in the Mississippi valley; from thence it moved southeastwardly and disappeared off the coast of the south Atlantic states on the 24th. In the west Gulf states and nearly everywhere east of the Mississippi river the minimum temperatures of the month occurred from the 20th to 24th, during the prevalence of this high area. At Escanaba, Michigan, a temperature of —24°.6 occurred on the morning of the 21st, this being the lowest recorded at so late a date since the station was established in 1872; in only one instance during that time has a lower temperature been recorded in March, viz, in 1884, on the 1st of the month.

VII.—This area first appeared in the extreme northwest on the afternoon of the 30th. The morning report of the 31st showed that the temperature in Manitoba had fallen 30° in twenty-four hours. At midnight the centre of the area was north of Manitoba. The barometer at stations in the lake region began rapidly to rise and indicated that the area was moving in that direction. A further description of this area will be found in the REVIEW for April.

AREAS OF LOW BAROMETER.

On chart i. are traced the paths of the centres of areas of low barometer which passed over the country during the month. But nine areas have been considered of sufficient importance for charting and description. Numbers i., ii., iv. and vii. made their appearance near Manitoba, and number v. approached the middle Atlantic coast from the sea. Numbers i., iv. and ix. disappeared in the Province of Ontario. Number vi., having a very peculiar track, has been traced for four days. These nine areas are described below.

The following table shows the latitude and longitude in which the centre of each area was first and last located, and the average hourly movement.

Areas of low barometer.	First observed.		Last observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long W.	
	° ′	° ′	° ′	° ′	
No. I	52 30	102 00	46 00	79 30	26.5
II	52 30	104 30	46 30	58 00	41.5
III	37 30	98 00	34 00	77 00	39.0
IV	51 30	103 30	46 30	79 00	33.0
V	39 00	73 30	48 00	66 00	33.5
VI	48 30	102 30	47 00	57 00	46.5
VII	51 00	100 00	51 00	63 30	34.0
VIII	37 00	83 30	35 00	74 00	34.5
IX	49 00	105 00	40 00	80 00	35.0
Mean hourly velocity					36.0

I. This area made its appearance in the Saskatchewan valley on the morning of the 2d, moving in a southeasterly direction. During the day light snows began falling in the lake region. The morning report of the 3d showed the centre of depression to be in western Michigan. From this point the area altered its course to a northeasterly direction and passed beyond the

limits of observation on the 4th. It was not accompanied by any high winds and with little precipitation.

II. This area appeared also in the Saskatchewan valley on the afternoon of the 8th, and moved in an almost direct southeasterly course to the coast of Maine, where it was central on the morning of the 10th. After this report it moved northeastwardly, passing over Nova Scotia and disappeared during the night of the 10th. Its passage was marked by violent gales on the lakes and the Atlantic coast and light precipitation in the northern districts. The lowest observed barometer was 29.32 at Halifax on the 10th. The following wind velocities occurred on the 9th: Alpena, Michigan, 40, w., at 9.50 p. m.; Toledo, Ohio, 40, sw., at 3.40 p. m.; Sandusky, Ohio, 43, sw., at 3.20 p. m.; Buffalo, New York, 56, sw., at 8.05 p. m.; Rochester, New York, 48, w., at 6.45 p. m. At Boston, Massachusetts, a velocity of 39, w., occurred at 9.45 a. m. on the 10th. The observer at Portland, Maine, reports that the signal displayed in advance of this storm was not justified at that station, but rough weather was experienced by vessels outside of the harbor on the 10th.

III.—Rain began falling in the western Gulf states during the afternoon of the 11th, and at midnight there developed in the Indian Territory an atmospheric depression which increased considerably in energy on the 12th. It moved in a direction a little south of east to the Atlantic coast, and was central off North Carolina on the morning of the 13th, and during the day disappeared. Quite heavy rains in the southern states, with light rains and snow in the middle Atlantic states and the Ohio valley and Tennessee, marked its passage.

IV.—The midnight report of the 13th showed the presence of this depression to the west of Manitoba. At this report the barometer at stations in the extreme northwest was over .50 below the normal. On the morning of the 14th the storm-centre was near Duluth, and rain and snow began falling in the lake region. After this report the depression recurved, the centre passing over the northern portions of Lakes Michigan and Huron. At 7 a. m. of the 15th the centre was near Rockcliffe, Province of Ontario, and was last observed at midnight of the 15th moving in a northeasterly direction. The lowest observed barometer was 29.24 at Rockcliffe on the 15th. At Milwaukee, Wisconsin, a wind velocity of 45, nw., occurred at 10.15 p. m. on the 14th, and on the 15th the following velocities were reported: Grand Haven, Michigan, 49, nw.; Escanaba, Michigan, 39, n.; Toledo, Ohio, 36, sw., at 4.07 a. m.; Sandusky, Ohio, 47, nw., at 5 a. m.; Erie, Pennsylvania, 35, w., at 8.30 a. m.; Buffalo, New York, 56, sw., at 9.20 a. m.; Rochester, New York, 52, sw., at 10.15 a. m.; Oswego, New York, 38, sw., at 11.15 a. m.

V.—This storm approached the middle Atlantic coast from the sea on the afternoon of the 15th about the same time that number iv. was passing over the Canadian provinces. At this hour, as closely as can be estimated the centre was nearly fifty miles to the east of Cape Henlopen. High winds prevailed on the Atlantic coast with general rains in New England, the middle, and south Atlantic states. On the morning of the 16th the centre was in eastern Maine, the depression having moved northeastwardly. Still continuing its initial movement it passed beyond the limits of observation on the 16th. Severe gales were reported from all stations on the New England and New Jersey coasts. The observer at Eastport reports that the storm began at 11.45 p. m. and continued until 8 a. m. of the 16th, the maximum wind-velocity, 43 miles, se., occurring at 6.40 a. m. The schooner "Dawn" was wrecked on Swallow-tail Rocks during the night of the 15–16th.

VI.—This storm having a peculiar track, developed in northern Dakota at midnight of the 19th. It moved directly south to Texas, where it was central on the morning of the 21st. It then recurved, passing over the Gulf of Mexico and northern Florida and moved in a northeasterly direction along the Atlantic coast. The morning report of the 22d showed the centre to be off Savannah, Georgia, and on the 23d off Nova Scotia, from whence it passed beyond the stations of observation. It was accompanied by precipitation in all districts except the lake region and by very high winds on the Gulf and Atlantic coasts. The lowest observed barometer was 29.74, at Sydney, Nova Scotia, on the 23d.

The observer at Norfolk, Virginia, reports the following: "a snow storm accompanied by high northerly winds began during the early morning of the the 22d and continued for twenty-four hours. Snow fell to a depth of four inches and six tenths, which, for this season of the year, is without precedent since the establishment of the signal office. The schooner "A. M. Bailey" was driven ashore during the storm near Cape Henry and became a total loss."

VII.—This area made its appearance in Manitoba on the morning of the 23d. It was central at 7 a. m. of the 24th, over Lake Huron. Light snows began falling in the lake region with strong south to west winds. The morning report of the 25th, showed the centre to be near Father Point, and the area passed into the Gulf of Saint Lawrence during the day. It moved at first in a southeast direction, but after reaching Lake Huron it recurved and passed down the Saint Lawrence valley. Its influence was but slightly felt on the Atlantic coast.

VIII.—On the morning of the 28th heavy rains began falling in the Gulf states and the reports showed the presence of a trough of barometric depression extending from Texas to eastern Tennessee. During the afternoon an area of low barometer formed from this trough in eastern Tennessee. The depression was at first weak but increased greatly in energy as it approached the North Carolina coast where it was central on the morning of the 29th. The winds in the immediate vicinity of the storm-centre reached a velocity of from forty-five to sixty miles an hour and on the New Jersey and southern New England coasts they had a velocity of from thirty to forty miles. Snow fell in New England and rains in the middle, south Atlantic, and Gulf states.

IX.—This depression was first observed on the morning of the 29th in northern Montana. It moved in a southeasterly direction to Lake Michigan, where it was central on the morning of the 30th. From thence it took a northeasterly course and passed beyond the limits of observation during the day. Light rains and snow fell during its passage in the lake region, upper Mississippi and Missouri valleys. The storm had but little energy, and the winds on the lakes, though strong, were not dangerous.

A very violent storm visited the Nova Scotia coast on the 19th, and is described in chapter on North Atlantic Storms. This storm was very severe and affected the whole Atlantic coast as far south as Smithville, North Carolina. During its passage the wind at Mount Washington, New Hampshire, on the 21st, reached a velocity of 128 miles per hour, and the temperature fell to —47°.

NORTH ATLANTIC STORMS DURING MARCH, 1885.

[*Pressure expressed in inches and in millimetres; wind-force by scale of* 0-10.]

The paths of the depressions that have appeared over the north Atlantic ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports furnished through the co-operation of the "New York Herald Weather Service," and from other miscellaneous data received at this office up to April 22d, 1885.

Of the ten depressions traced during the month, three, viz.: numbers 6, 7 and 10 were continuations of storms which entered the Atlantic from the North American continent; number 2 was a continuation of a depression which occupied mid-ocean at the close of February; numbers 1 and 4 prevailed over the region to the eastward of the thirtieth meridian, while the remaining depressions, numbers 3, 5, 8, and 9, first appeared near the American coast. The general direction of movement of the storm-centres was northeasterly; the tracks of numbers 7 and 8, however, were somewhat abnormal, those

depressions having moved from the region south of 35° N., in a northerly direction to the Gulf of Saint Lawrence, whence they passed beyond the range of observations. None of the depressions which passed into the Atlantic from the American continent appear to have reached Europe, nor have any of them exhibited much energy during their passage, the month being, in general, unusually free from dangerous storms. An exception to the above may be made in the case of the depression traced as number 8, this was unusually severe during its passage over Nova Scotia and the Gulf.

So far as can be determined from the data as yet to hand it would appear that an extensive area of low barometer occupied the ocean between N. 40° and 55° and from the European to the American coasts from the 1st to the 3d, causing variable winds and unsettled weather. On the 3d an area of high barometer formed between W. 35° and 50°, while the region of low pressures extended from the European coasts westward and southwestward to the Azores; to the westward of the sixtieth meridian the pressure remained unsteady and the weather unsettled. These conditions were maintained, with slight changes, until the 8th, when the high area apparently occupied the region north of the fiftieth parallel, and relatively low pressures prevailed to the southward of that parallel. By the 13th the high area in the north, which had apparently moved eastward and southward to the British Isles and to the latitude of the Azores, now began to spread westward over the ocean, and from that date until the 28th the area of high barometer occupied the ocean from W. 50° to the European coasts; after the 28th it moved westward to the American coasts.

The following are brief descriptions of the depressions charted:

1.—This depression was shown on the 1st between N. 50° and 55° and W. 25° and 30°, the lowest reported barometer reading being 29.53 (750.0); at the same time there was another large depression in the vicinity of N. 45°, W. 40°. By the 2d low area number 1 had passed northward beyond the range of observations, attended by strong w. and sw. breezes and number 2 had advanced eastward, the two depressions forming an extensive area of low pressures covering the ocean from W. 40° eastward, and from N. 60° southward to N. 45°.

2. This depression appeared near N. 40° and 45°, and W. 40° and 45° on the 1st, and was probably closely connected with the disturbance charted as number 11 on the chart for February and with number 1 above described. The following are the lowest barometric readings reported on the 1st: s. s. "Moravia," O. Pezoldt, commanding, in N. 41° 40′, W. 48° 40′, barometer 29.22 (742.2), wind s., force 4, cloudy; s. s. "Wyoming," C. L. Rigby, commander, in N. 44° 3′, W. 43° 59′, barometer 29.34 (745.2), wind variable, force 3, changeable weather; s. s. "Eider," H. Hellmers, commander, in N. 42° 39′, W. 46° 1′, barometer 29.46 (745.7) winds westerly, force 2, weather squally. On the following day the winds over the region between W. 30° and 50° shifted to n., and blew with the force of a moderate to strong gale; those to the northward of 49° N. and east of 30° W., were e. and s., moderate in force, while the barometer ranged from 29.3 (744.2), to 29.6 (751.8), and cloudy or rainy weather prevailed. On the 3d the centre of disturbance was near the west coast of Ireland, the lowest barometer reported being 29.14 (740.1) on board the s. s. "Venetian," W. H. Trant, commanding, in N. 51° 23′, W. 12° 58′, wind w., moderate gale; over the English channel and Ireland moderate to strong s. and sw. gales prevailed, while, over the region west of the fifteenth meridian, the winds blew with the force of a gale from n. and ne. During the 3d the depression apparently passed across the British Isles.

3.—This depression appeared between W. 70° and the American coasts on the 1st. On that date the bark "Winifred," N. P. Dutton, master, reported, in N. 37° 17′, W. 73° 15′, barometer 29.85 (758.2), being a fall of more than .3 inch since February 28th; at the observation of the 1st the vessel had variable winds, reported as n., calm, and ssw., weather hazy. The s. s. "City of Augusta," K. S. Nickerson, commander, from Savannah to New York, reported, in N. 37° 14′, W. 75° 30′, barometer 29.86 (758.4), being a fall of .2 inch since the observation of the preceding day; wind ssw., force 4, weather hazy. As the disturbance moved northeastward it increased in energy and the 2d its centre was to the southward of Nova Scotia.

The following vessels came within the influence of this depression during the 2d: the s. s. "Andes," R. de Echevarrieta, commander, had a strong gale from ssw. to wsw. and nw., between 7 p. m. of the 1st and 5 a. m. of the 2d, in N. 36° 30′, W. 71° 0′, the barometer read 29.5 (749.3), wind sw., force 7, squally weather and rain; the schooner "Maggie Abbott," D. C. McIntosh, commanding, in N. 32° 0′, W. 74° 0′, had barometer 29.7 (754.4), wind nw., force 9, heavy rain and heavy cross sea. At Bermuda, strong w. and sw. winds and rainy weather prevailed. The s. s. "Nessmore," J. Inch, commanding, in N. 37° 30′, W. 73° 6′, had barometer 29.48 (748.8), wind nw., force 5, clear; the s. s. "Westernland," Commodore W. G. Randle, commanding, in N. 40° 37′, W. 69° 1′, had barometer 29.51 (749.5), wind w. by n., force 4, weather overcast. Captain F. V. Schierbeck, commanding the s. s. "Geiser," reported as follows: "2d.—2.45 p. m., Greenwich time, wind s. by w., force 9, barometer 29.61 (752.0), falling; 4.26 p. m., in N. 40° 38′, W. 64° 36′, barometer 29.55 (750.5), wind s. by w., force 9, hove ship to; at 7.16 p. m., in N. 40° 47′, W. 64° 24′, wind lulled, and barometer rose to 29.57 (751.0), and the wind gradually veered to nw. by w., force 5, dark, rainy sky; after this the barometer rose slowly and the wind and weather gradually became more settled, but a very heavy sea remained."

At 4 p. m. of the 2d the s. s. "Waesland," J. Ueberweg, commanding, in N. 41° 16′, W. 62° 10′, had a whole gale from s. to sw. and wnw., lowest barometer 29.61 (752.8); and the s. s. "Scythia," P. Whealan, commanding, reported a southerly gale, which set in at 8 p. m. of the 2d (position at noon, N. 42° 1′, W. 56° 5′), and reached its height (force 9) at midnight, ending at about 6 a. m. of the 3d; at 1.30 a. m. of the 3d the wind veered to nw., accompanied by torrents of rain, and at 4 a. m. the lowest barometric reading, 29.57 (751.1), was observed. By the 3d the disturbance was to the southward of Newfoundland, with the pressure varying from 29.45 (748.0) to 29.6 (751.8), and strong nw. gales in its rear, near and to the westward of the fifty-eighth meridian. An area of high pressure occupied the region between W. 35° and 50°, apparently barring the advance of the depression, which probably filled in during the day.

4.—During the 3d, 4th, and 5th the barometer remained low over the ocean south of 50° N. and between the European coasts and the Azores; on the last-mentioned date a storm-centre was apparently near the northwestern coast of Spain, where the barometer read 29.41 (747.0). During the day the depression passed northeastward over the Bay of Biscay and entered northern France.

5.—This depression appeared off the United States coast south of 40° N. on the 8th, the reports on that date showing a decrease of pressure amounting to about .2 inch. At the same time there was a depression (*5a*) in the neighborhood of Bermuda, as shown by the report of the s. s. "Orinoco," in port there; Captain Garvin, commanding the above steamship, reported lowest barometer 29.65 (753.1) at 6 p. m. of the 9th. "This storm began about 8 a. m. of the 8th and continued as a fresh to strong gale with heavy gusts until the evening of the 9th when it shifted to wnw. in a heavy storm of wind, thunder, lightning and rain, ceasing at midnight; the barometer continued steady at about 29.75 (755.6) when it began to rise." As number 5 moved northeastward it was attended by moderate to strong gales of short duration from e. to ne. and nw. the barometer falling to 29.4 (746.7); on the 9th the storm centre was apparently to the eastward of Nova Scotia, causing moderate w. gales between W. 50° and 60°. On the 10th the region of low pressures was shown near N. 47° and between W. 40° and 45°, where the barometer ranged from 29.55 (750.6)

to 29.65 (753.1) with moderate gales from s. to nw; on the 11th the disturbance disappeared with rising barometer.

From the 6th to the 8th the reports indicate the presence of an area of low barometer over the ocean between W. 50° and 60° and N. 40° and the coast of Newfoundland; during those dates the barometer fluctuated between 29.5 (749.3) and 29.8 (756.9), and unsettled, squally weather prevailed.

6.—This was a continuation of the depression which passed over the North American continent and described as low area ii. under "Areas of low barometer." During the 10th it passed over Nova Scotia, and on the 11th its centre was near the southeastern point of Newfoundland, whence it moved east-northeastward and apparently filled in during the 12th. Its passage was attended by moderate w. and sw. gales, shifting to strong nw. winds on the 12th.

7.—This was a continuation of the depression described as low area iii. under "Areas of low barometer." It passed off the North Carolina coast on the 13th and moved northeastward, causing strong ne. to nw. gales during its passage. Captain Garvin, commanding the s. s. "Orinoco," reported barometer 29.37 (746.0) at 1 a. m. of the 14th, in N. 36° 30′, W. 69° 5′; the gale began with sw. wind, heavy rain and lightning on the afternoon of the 13th, and shifted suddenly to nw. on the morning of the 14th. Vessels to the northward of 40° N. and near the coasts of New England and Nova Scotia had n. and ne. gales, while those to the eastward of W. 58° had s. and ese. winds and rainy weather. During the day the depression was apparently forced to the northwestward by an area of high barometer which was spreading westward over the ocean, and during the 15th the disturbance disappeared in Newfoundland.

8.—From the 16th to the 18th the reports showed unsettled atmospheric conditions existing between Bermuda and the coast of the United States, the barometer being unsteady and relatively low, while strong n., ne., nw., and s. winds to gales prevailed over that region. On the 18th Captain J. R. Beers, commanding the s. s. "Advance," reported: "10 p. m. of the 18th, in N. 34° 0′, W. 71° 10′, barometer 29.5 (749.3); at 8 a. m. it was blowing a moderate sw. gale, hauling during the day around by w. until 10 p. m., when it reached a force of 9, and was accompanied by heavy thunder and lightning; at midnight the wind was n." The schooner "L. F. Munson," J. H. Smith commanding, in N. 33° 16′, W. 74° 57′, had barometer 29.68 (753.9), wind nw. by w., force 5; the ship "Ringleader," J. C. Entwistle commanding, in N. 33° 25′, W. 74° 0′, had barometer 29.75 (755.6), wind n., force 7, squally. The disturbance moved north-northeastward, and on the 19th its centre was near N. 42°, W. 62°, where the pressure was 29.0 (736.6); strong nw. gales, accompanied by rain, sleet, and snow now prevailed between W. 65° and the coast-line from Cape Hatteras northward, and continued during the 20th. The following are the lowest pressures reported on the 19th: s. s. "Lessing," B. Voss, commander, in N. 41° 0′, W. 65° 20′, 8 a. m., barometer 29.05 (737.9), wind ene., shifting to se., sse., sw., and w., and blowing a strong gale; s. s. "Ems," C. Leist, commander, in N. 41° 15′, W. 61° 50′, 11.20 a. m., barometer 29.06 (738.1), wind se. to s. and w., whole gale; s. s. "Denmark," Captain Jeffrey, commander, in N. 41° 4′, W. 59° 50′, barometer 29.06 (738.1), at 11 a. m., gale from sse., veering suddenly to w.; s. s. "Adriatic," H. Parsell, commander, in N. 41° 57′, W. 57° 32′, barometer 29.19 (741.4), s. gale of force 9, veering to w. During the 19th the depression passed northward over Nova Scotia as a severe storm and entered the Gulf of Saint Lawrence on the 20th, after which it passed beyond the range of observations.

9.—This was probably subsidiary to number 8 above-described. After the passage of that disturbance there was a slight increase of pressure but no abatement in the force of the wind. On the 20th the barometer again fell; Captain Garvin, commanding the s. s. "Orinoco," in N. 38° 00′, W. 71° 00′, reporting, barometer 29.33 (745.0), at 10 a. m. of the 20th, fresh gale from nw.; at the same time strong winds to moderate gales from e. and se. prevailed over the region to the eastward of W. 65°. On the 21st the depression, having moved northeastward over the Banks, was apparently central off the southeastern coast of Newfoundland; the w. and nw. gales still continued in the Gulf Stream and the winds had shifted to w. and nw. over the ocean as far as W. 55°, while those to the eastward of that meridian blew with the force of a moderate gale from s., with barometer readings ranging from 29.6 (751.8) to 29.7 (754.4). The barometer rose during the 21st and by the following day the depression had apparently filled in.

10.—This was a continuation of the depression described as low area vi. under "Areas of low barometer" in this REVIEW. By the morning of the 23d this disturbance having passed as a somewhat severe storm northeastward along the Gulf Stream, was central to the southeastward of Nova Scotia with the lowest reported pressure 29.3 (744.2), and attended by moderate to strong gales in all quadrants. An area of high pressure occupied the ocean east of W. 50° and south of N. 45°, along the northwestern edge of which, this depression appears to have passed, with gradually increasing pressure, and by the 24th it was shown near N. 48° W. 45°, where the barometer read about 29.7 (754.4). Strong s. winds prevailed over the region east of 45° W. with n. and nw. winds to the westward. By the 25th the depression had moved northeastward beyond N. 50° and near W. 35°, being attended by moderate sw. gales over the region between N. 50° and 45° and W. 40° and 30°, while nw. and w. winds prevailed over the ocean from W. 40° to the American coast.

The reports indicate the existence of a slight depression which was attended by moderate gales, between W. 60° and the American coast during the 28th and 29th; by the 30th, however, it had disappeared, as the high area from the ocean began to spread westward, and on the 31st it had reached the coast line, the pressure over the ocean west of the sixtieth meridian ranging from 30.4 (772.1) to 30.65 (778.5).

OCEAN ICE.

On chart i. are also exhibited the eastern and southern limits of the region within which icebergs have been observed during March, 1885. These limits are determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register," and other newspapers.

During this month the easternmost icebergs were reported in about W. 43° and between N. 44° and 46°; from that point the outer edge of the ice-region extended southwestward, its extreme southern limit being in N. 40° 50′, W. 49°, and thence northwestward to about N. 44° 30′, W. 62° 0′. Field ice was observed between N. 46°, W. 47° and N. 44°, W. 49°, and also between N. 44° 30′, W. 57° 0′ and N. 44°, W. 62′.

Compared with the chart for the preceding month (February 1885) it will be seen that the eastern limit of the ice-region is about one degree west of that for February, while the southern limit has advanced southward about one degree. No reports have been received which indicate the presence of ice to the westward of the sixty-third meridian. Icebergs and field-ice were neither so large nor so numerous as in the preceding month.

The following table shows the comparison between March, 1885, and the same month of the three preceding years:

Southern limit.			Eastern limit.		
Date.	Lat. N.	Lon. W.	Date.	Lat. N.	Lon. W.
	° ′	° ′		° ′	° ′
March, 1882	42 30	50 00	March, 1882	46 30	46 00
March, 1883	41 46	49 48	March, 1883	48 41	43 03
March, 1884	41 20	54 06	March, 1884	45 00	40 15
March, 1885	40 35	49 04	March, 1885	45 57	43 15

Icebergs and field-ice were reported as follows:

March 1st.—S. S. "Hanoverian," in N. 42° 50′, W. 50° 0′, passed several icebergs and some field-ice; kept away fifteen miles to the southward to clear the ice; in N. 42° 35′, W. 51° 19′, one iceberg and several detached pieces of ice were passed.

S. S. "Canada," in N. 44° 56′ W. 48° 43′, from 2.30 to 6.30 a. m., encountered field-ice. S. S. "Dago," reported 1 a. m., encountered field-ice; at noon in N. 45° 19′, W. 48° 23′, was surrounded by thick ice; midnight, still surrounded by field-ice; at 2.30 a. m. of the 2d, cleared field-ice. The s. s. "Scythia," in N. 42° 34′, W. 49° 0′, passed an iceberg. The s. s. "Moravia," in N. 41° 40′, W. 48°. 40′, at 8 a. m. passed an iceberg about one hundred feet long and fifty feet high, and several smaller pieces of ice about one mile to the northward; temperature of water, 47° Fahr.; air, 56° Fahr.

2d—S. S. "Roman," in N. 43° 16′, W. 49° 5′, passed numerous icebergs and large ice-fields as far as the eye could reach; temperature of sea water, 28° Fahr. The s. s. "City of Montreal," in N. 41° 56′, W. 52° 27′, at 8.35 p. m. passed a large iceberg; also at 8.52 a. m. in N. 42° 16′, W. 49° 0′, passed another. The s. s. "Ontario," in N. 42° 17′, W. 51° 24′, passed seven large icebergs. The s. s. "Bohemia," in N. 42° 2′, W. 47° 56′, passed an iceberg about two hundred feet high.

3d.—S. S. "Donau," between N. 42° 55′, W. 49° 24′, and N. 42° 34′, W. 52° 13′, passed three icebergs ranging from sixty to one hundred feet high; the s. s. "State of Indiana," in N. 41° 28′, W. 48° 27′, at 9 p. m., passed an iceberg.

4th.—S. S. "City of Richmond," in N. 42° 30′, W. 48° 30′ at 3 a. m. passed an iceberg, water 36°, air 38°; at 2.30 p. m. in N. 42° 33′, W. 51° 22′, passed another, water 34°, air 38°. The s. s. "Elbe," in N. 42° 33′, W. 47° 59′, at 3.30 p. m. passed several icebergs of different dimensions. The s. s. "Amaryllis," at 2 p. m. in N. 40° 55′, W. 49° 4′ passed an iceberg; s. s. "Waesland," at 8.30 a. m. passed an iceberg; s. s. "De Ruyter," in N. 46° 44′, W. 44° 14′, passed an iceberg; s. s. "Celtic," at 11 p. m. in N. 42° 44′, W. 48° 15′, passed one large and two small icebergs.

5th.—S. S. "Oregon," in N. 42° 35′, W. 48° 30′, passed two pieces of ice; s. s. "Wieland," in N. 43° 17′, W. 47° 29′, passed an iceberg, and during the afternoon passed several others north and south of ship's course. The s. s. "Holland," between N. 42° 47′, W. 49° 53′ and N. 42° 30′, W. 51° 14′, passed several icebergs and large pieces of ice; s. s. "Celtic" in N. 41° 54′, W. 51° 58′, passed two icebergs to the northward and one to the southward. The s. s. "De Ruyter" in N. 45° 44′, W. 48° 58′ reported at 9 a. m. passed between four large icebergs; at noon entered field ice, being mostly two feet in thickness; at 6 p. m. passed another large iceberg; at 9. p. m. came to open water; at midnight met field-ice again, but very thin; at 3.30 a. m. of the 6th, reached open water again.

6th.—S. S. "Istrian" in N. 43° 0′, W. 49° 0′, at 8 a. m. passed several icebergs, also passed a very large berg at 9 p. m. in N. 42° 37′, W. 52° 0′. The s. s. "Carthagenian" in N. 42° 3′, W. 53° 0′, passed three large icebergs; s. s. "De Ruyter," in N. 45° 12′, W. 53° 31′, at noon passed an iceberg.

7th.—S. S. "Sidonian," in N. 41° 53′, W. 52° 28′, passed an iceberg about three hundred feet high, and some small ice; s. s. "Circassia," in N. 42° 42′, W. 48° 35′, passed a large iceberg; s. s. "State of Georgia," in N. 42° 53′, W. 48° 33′, at 10.30 a. m. passed a small iceberg; s. s. "Labrador," in N. 42° 30′, W. 48° 15′, at 3 a. m., passed an iceberg. The s. s. "De Ruyter," in N. 44° 45′ W. 57° 28′ at noon, entered field-ice at 4 p. m.; at 8 p. m., field-ice becoming thicker, obliged to reduce speed to dead-slow; cleared field-ice at 6 a. m. of the 8th, position at noon of the 8th, N. 44° 41′, W. 61° 20′.

8th.—S. S, "Somerset" saw an iceberg and some field-ice on the eastern edge of the Banks; the ship "Asia," in N. 43° 0′, W. 48° 0′, passed a large iceberg; s. s. "Iowa," in N. 41° 38′, W. 52° 25′, passed an iceberg.

9th.—S. S. "Otranto," in N. 44° 20′, W. 49° 10′, passed a large iceberg; s. s, "Somerset," in N. 43° 14′, W. 51° 31′, passed three icebergs; ship "Trojan," in N. 43° 0′, W. 52° 0′, passed three icebergs; s. s. "City of Berlin," in N. 41° 17′, W. 52° 20′, passed an iceberg.

10th.—S. S. "Richmond Hill," in N. 42° 1′, W. 52° 17′, passed an iceberg, one hour later passed five others; Captain Hyde reports: "whilst in the vicinity of ice I noted a rapid change in the temperature of the sea; in N. 41° 58′, W. 53° 18′, water temperature 33°; in N. 41° 56′, W. 53° 42′, water temperature 52°." The s. s. "Republic," in N. 41° 48′, W. 52° 40′, at 10 a. m., passed two icebergs about nine miles to the northward of the ship; the s. s. "Rhein," in N. 42° 6′, W. 52° 24′, at 8.20 a. m., passed a large iceberg; ship "Lizzie Ross," in N. 43° 2′, W. 46° 0′, passed a large iceberg; ship "Minnie G. Whitney," in N. 43° 25′, W. 51° 23′, passed three icebergs.

11th.—S. S. "Fulda," in N. 42° 13′, W. 51° 19′, passed a large iceberg and some pieces of drift ice; bark "Montreal," in N. 43° 10′, W. 50° 10′, passed three large icebergs; s. s. "Katie," in N. 42° 10′, W. 50° 15′, passed an iceberg twenty feet high. The s. s. "Stockholm City," in N. 43° 12′, W. 50° 20′, at noon passed four small icebergs; 3 p. m., passed two very large bergs, one of which appeared to be aground.

12th.—S. S. "Katie," in N. 42° 4′, W. 52° 5′, passed four icebergs from seventy to eighty feet high; s. s. "Normandie," in N. 43° 54′, W. 47° 15′, at 4.30 p. m. passed a small iceberg; s. s. "Polynesian," in N. 42° 56′, W. 50° 38′, passed an iceberg; bark "Charles Luling," in N. 43° 19′, W. 48° 14′, passed a large iceberg; s. s. "Grecian," in N. 44° 1′, W. 43° 30′, at 1.50 p. m. passed a large iceberg, temperature of water, 60°; air, 42°.

13th.—S. S. "Gallia," in N. 42° 33′, W. 51° 30′, at 10 p. m., passed an iceberg; ship "Lansdowne," in N. 42° 47′, W. 53° 0′, passed a large iceberg; bark "Charles Luling," in N. 42° 2-′, W. 51° 15′, passed three icebergs; s. s. "Australia," in N. 42° 6′, W. 53° 8′, at 4 p. m., passed a small iceberg.

14th.—Ship "Shakespere," in N. 43° 0′, W. 49° 0′, passed three icebergs; ship "Mary Fraser," in N. 44° 36′, W. 43° 41′, passed a large iceberg; ship "Rhine," in N. 43° 0′, W. 50° 0′, passed six large icebergs; bark "Saint Bernhard," in N. 41° 15′, W. 50° 10′, passed a large iceberg.

15th.—S. S. "Helvetia," in N. 41° 55′, W. 49° 23′, passed an iceberg; bark "Astronom," in N. 42° 10′, W. 49° 40′, passed a large iceberg.

16th.—S. S. "Cydonia," in N. 46° 0′, W. 47° 0′, passed through a quantity of field ice.

17th.—S. S. "Cydonia," in N. 45° 0′, W. 49° 20′, passed a large iceberg.

18th.—S. S. "Ems," in N. 41° 34′, W. 53° 35′, passed two large pieces of ice, in N. 41° 33′, W. 53° 45′, passed a small iceberg; bark "Johanne Marie," in N. 45° 57′, W. 43° 15′, passed two icebergs.

20th.—Bark "Johanne Marie," in N. 44° 30′, W. 49° 8′, passed a large iceberg.

21st.—S. S. "Ethiopia" in N. 43° 25′, W. 49° 17′, passed two icebergs.

22d.—S. S. "Ontario," in N. 43° 1′, W. 47° 40′, passed a large iceberg; s. s. "Siberian," in N. 42° 40′, W. 51° 38′, at 4.26 p. m., passed an iceberg bearing s. ten miles distant; at 6.59 p. m., in N. 42° 45′, W. 52° 10′, passed two smaller bergs with several pieces of drift ice between and around the bergs; temperature of air, 41°; sea. 36°. The s. s. "Venetian," in N. 42° 2′, W. 51° 10′, passed a small berg; in N. 43° 2′, W. 52° 50′, passed a medium-sized iceberg.

23d.—S. S. "Ontario," in N. 42° 46′, W. 52° 33′, passed an iceberg; bark "Nova Scotia," in N. 43° 0′, W. 50° 0′, passed two large icebergs.

25th.—S. S. "Britannic," in N. 44° 7′, W. 48° 50′, passed a large iceberg; in N. 44° 7′, W. 49° 5′, passed a small iceberg; s. s. "Elysia," in N. 43° 50′, W. 49° 40′, at 5.30 a. m., passed a small iceberg; schooner "J. A. Chapman," in N. 43° 0′, W. 54° 30′, passed a large iceberg; schooner "G. L. Smith," in N. 43° 40′, W. 51° 50′ passed several icebergs two of which were very large.

26th—S. S. "Britannic," in N. 42° 48′, W. 54° 2′, passed a small iceberg; s. s. "Devon," in N. 46° 30′, W. 47° 10′, at 7 a. m., passed six icebergs, also fifty miles wsw. of that position passed another.

27th.—S. S. "Aurania," in N. 42° 52′, W. 50° 28′, at 2 p. m., passed several icebergs to n. and s. of ship's course; bark

"Chignecto," in N. 42° 30′, W. 50° 15′, passed a large iceberg.

28th—S. S. "Caspian," in 43° 00′, W. 50° 00′, passed two icebergs.

31st.—S. S. "City of Rome," in N. 43° 14′, W. 49° 35′, passed an iceberg; s. s. "Norwegian" sighted several icebergs between Cape Pine and Saint John's harbor.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York and Philadelphia, and in the Custom House, Boston, where the necessary blanks and other information will be furnished to shipmasters. In January REVIEW was published an explanation of the object of these agencies.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were, during March, 1885, twelve reports cabled to that office from New York, concerning storm and icebergs encountered by vessels in the Atlantic west of the forty-fifth meridian. Four messages were sent from Boston.

TEMPERATURE OF THE AIR.

[*Expressed in degrees, Fahrenheit.*]

The distribution of mean temperature over the United States and Canada for March, 1885, is exhibited on chart ii. by the dotted isothermal lines; and in the table of miscellaneous data are given the means for the various stations of the Signal Service.

In the following table are given the mean temperatures for the several geographical districts with the normals and departures, as deduced from the Signal Service observations:

Average temperatures for March, 1885.

Districts.	Average for Mar. Signal-Service observations.		Comparison of Mar., 1885, with the average for several years.
	For several years.	For 1885.	
	°	°	°
New England	33.6	26.8	— 6.8
Middle Atlantic states	41.0	33.6	— 7.4
South Atlantic states	54.6	48.4	— 6.2
Florida peninsula	67.0	62.4	— 4.6
Eastern Gulf states	58.2	52.2	— 6.0
Western Gulf states	59.9	55.7	— 4.2
Rio Grande valley	70.0	66.4	— 3.6
Tennessee	50.3	44.4	— 5.9
Ohio valley	42.2	34.3	— 7.9
Lower lake region	33.5	23.6	— 9.9
Upper lake region	30.5	17.0	— 9.5
Extreme northwest	30.3	21.9	+ 1.6
Upper Mississippi valley	36.8	34.3	— 2.5
Missouri valley	31.8	34.4	+ 2.6
Northern slope	32.0	38.1	+ 6.1
Middle slope	40.8	40.4	— 0.4
Southern slope	55.8	51.5	— 4.3
Southern plateau	52.0	54.0	+ 2.0
Middle plateau	40.4	45.0	+ 4.6
Northern plateau	40.9	47.0	+ 6.1
North Pacific coast region	46.0	49.9	+ 3.9
Middle Pacific coast region	54.0	58.9	+ 4.9
South Pacific coast region	58.5	62.6	+ 4.1
Mount Washington, N. H	11.1	2.1	— 9.0
Pike's Peak, Colo	7.8	9.3	+ 1.5

In the extreme northwest, upper Missouri valley, Rocky mountain region, and on the Pacific coast, the mean temperatures for March, 1885, were above the normal, while in all districts to the eastward they were below the normal. The greatest departures below the normal occurred in the lake region and Ohio valley, where, at numerous stations, the departures exceeded 10°. In the Gulf states and in the districts along the Atlantic coast, the departures, though less marked, were decidedly below the normal. In the districts where the month has been warmer than the average the departures above the normal temperature have been greatest in the northern slope and northern plateau, where they averaged 6°.1; in the middle plateau and on the Pacific coast the departures averaged about 4°.

RANGES OF TEMPERATURE.

The monthly and daily ranges of temperature at the various Signal Service stations are given in the table of miscellaneous meteorological data. They varied from 24° at Key West, Florida, and 24°.5 at Tatoosh Island, Washington Territory, to 73° at Escanaba, Michigan, and 76° on the summit of Mount Washington, New Hampshire. In all districts east of the Rocky mountains, except along the Gulf coast and on the Atlantic coast south of Massachusetts, the monthly ranges of temperature exceeded 50°.

DEVIATIONS FROM MEAN TEMPERATURE.

The departures exhibited by the reports from the regular Signal Service stations are shown in the table of average temperatures for the various districts, also in the table of miscellaneous data and on chart iv. The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone county: mean temperature, 45°.5, is 4°.4 below the March average for the three preceding years.

California.—Hydesville, Humboldt county: mean temperature, 51°.7, is above the average for March; it is 3°.2 above that for March, 1884.

Connecticut.—Hartford: mean temperature, 26°.7, is 7°.7 below that for March, 1884.

Norfolk: mean temperature, 19°.7, is the lowest recorded in March during the last forty years.

Dakota.—Webster, Day county: mean temperature, 27°.6, is 5°.4 above the March average for the two preceding years.

Georgia.—Milledgeville: the month was the coldest March for many years; the mean temperature, 49°.8, is 7°.4 below that for March, 1884.

Illinois.—Mattoon, Coles county: mean temperature, 34°.5, is 3°.7 below the March average for the last five years.

Anna, Union county: mean temperature, 40°.7, is 5°.7 below the March average for the last ten years.

Swanwick, Perry county: mean temperature, 38°.2, is 5°.4 below the March average for the last three years.

Riley, McHenry county: mean temperature, 24°.8, is 5°.3 below the March average for the last twenty-four years. The mean temperature for the first twenty-three days was lower than for any corresponding period previously recorded.

Peoria, Peoria county: mean temperature, 34°.1, is 4°.6 below the March average for the last thirty years.

Sycamore, Dekalb county: mean temperature, 25°.7, is 6°.8 below the March average for the three preceding years.

Indiana.—Logansport, Cass county: mean temperature, 29°.6, is 10°.7 below the March average for a period of twenty-six years.

Vevay, Switzerland county: mean temperature, 35°.7, is 7°.1 below the March average for the last twenty-one years. The minimum temperature on the 23d, 8°, is the lowest that has occurred at so late a date during the above period.

Spiceland, Henry, county: mean temperature, 30°.1, is 6°.3 below the March average for a period of thirty years.

Kansas.—Independence, Montgomery county: mean temperature, 43°.1, is 2° below the March average for the last fourteen years.

Wellington, Sumner county: mean temperature, 41°.6, is 1°.6 below the March average for the last seven years.

Lawrence, Douglas county: mean temperature, 40°.6, is 1°.2 below the March average for the last seventeen years.

Yates Centre, Woodson county: mean temperature, 40°.4, is slightly below the March average for the last five years.

Maine.—Gardiner, Kennebec county: mean temperature, 20°.8, is 8°.7 below the March average for the last forty-nine years, and is the lowest recorded during that period, the next lowest being 22°.0 for March, 1872.

Maryland.—Fallston, Harford county: mean temperature, 30°.6, is the lowest recorded in March during the last fourteen years, and is 8°.1 below the average for the same period; it is but a small fraction of a degree above the mean temperature for January for a period of fifteen years.

Massachusetts.—Somerset, Bristol county: mean temperature. 28°.2, is 6°.2 below the March average.

Worcester, Worcester county: mean temperature, 23°.5, is the lowest recorded in March for forty-seven years, and is 9°.8 below the average for the same period.

Michigan.—Thornville, Lapeer county: mean temperature, 21°, is about 10° below the normal for March.

Nevada.—Carson City: mean temperature, 47°.2, is 8°.3 above the March average.

New Hampshire.—Contoocook, Merrimack county: mean temperature, 23°.7, is about 7°.5 below the March average.

New Jersey.—Moorestown, Burlington county: mean temperature, 29°.7, is 8°.5 below the January average for a period of twenty-two years, and is 1°.7 lower than that for March, 1872, which was the lowest previously recorded.

South Orange, Essex county: mean temperature, 28°.9, is 7° below the March average for fifteen years; it is but 0°.1 above that for March, 1872—the lowest recorded during the above period.

New York.—North Volney, Oswego county: mean temperature, 18°.6, is the lowest recorded for March during the last eighteen years, and is 9°.3 below the average for the same period.

Table of comparative minimum temperatures for the month of March.

State or Territory.	Minimum for March, 1885, Signal Service.		Minimum since Signal-Service stations were opened—3 to 14 years.			Lowest from any other source.			
	Station.	Temperature.	Station.	Temperature.	Year.	Place.	Temperature.	Year.	Length of record.
		°		°			°		Years.
Alabama	Montgomery	26.2	Montgomery	25	1873	Huntsville	11		9
Do	Mobile	29.0	Mobile	31	1876	Mobile	31		33
Arizona	Prescott	20.8	Prescott	— 8	1876	Fort Canby (old)	— 1		12
Do	Fort Apache	22.0	Fort Apache	11	1881	Fort Apache	5	1875	8
Arkansas	Fort Smith	24.3	Fort Smith	23.5	1884	Fort Smith	— 3		32
Do	Little Rock	27.1	Little Rock	28	1884	Little Rock	12		28
California	Sacramento	45.8	Sacramento	29	1880	Camp Bidwell	0		19
Do	San Francisco	49.5	San Francisco	39	1880	Presidio	35		27
Colorado	Pike's Peak	—12.0	Pike's Peak	—29	1875	Fort Garland	— 1		22
Do	Denver	5.4	Denver	—10	1880	Fort Lyon	— 7		23
Connecticut	New London	6.3	New London	4	1884	Colebrook	—10		12
Do	New Haven	— 0.2	New Haven	0.8	1884	New Haven	— 9		86
Dakota	Fort Buford	2.7	Fort Buford	—23	1880	Fort Buford	—40	1867	14
Do	Yankton	2.4	Yankton	—10	1876, 1880	Fort Abercrombie	—40	1861, 1869?	19
Delaware			Delaware Breakwater	15.3	1884	Fort Delaware	5		45
District of Columbia	Washington City	10.3	Washington City	4	1873	Washington City	— 5		49
Florida	Pensacola	31.2	Pensacola	36	1881	Fort Barrancas	28		59
Do	Key West	60.9	Key West	53	1873	Key West	49		44
Georgia	Savannah	33.3	Savannah	27	1873	Savannah	27		37
Do	Augusta	26.4	Augusta	22	1873	Augusta Arsenal	15		49
Idaho	Boisé City	27.7	Boisé City	9	1882	Fort Hall	— 1		5
Do	Lewiston	29.6	Lewiston	12	1880	Fort Lapwai	1		19
Illinois	Chicago	4.4	Chicago	— 0.9	1884	Chicago	—12		38
Do	Cairo	16.5	Cairo	10	1873	Rock Island Arsenal	—14		11
Indiana	Indianapolis	3.2	Indianapolis	2	1873	Spiceland	0		14
Indian Territory	Fort Reno	21.6	Fort Gibson	7	1876	Fort Gibson	7		48
Do	Fort Sill	23.5	Fort Sill	10	1880	Camp Supply	2	1876	2
Iowa	Dubuque	— 1.1	Dubuque	—10	1875	Muscatine	—10		27
Do	Keokuk	8.6	Keokuk	—10	1873	Algona	—25		10
Kansas	Leavenworth	15.0	Leavenworth	2	1876	Fort Leavenworth	— 9		32
Do	Dodge City	13.4	Dodge City	— 8	1880	Fort Riley	— 20		21
Kentucky	Louisville	12.3	Louisville	3	1873	Newport Barracks	3		29
Louisiana	Shreveport	31.0	Shreveport	20	1876	Baton Rouge	20		58
Do	New Orleans	36.0	New Orleans	36.5	1876	New Orleans	29		51
Maine	Eastport	— 5.2	Eastport	— 4	1873	Gardiner	—20		43
Do	Portland	1.1	Portland	— 0.5	1883	Portland	—13		37
Maryland	Baltimore	11.8	Baltimore	5	1873	Fort McHenry	0		53
Massachusetts			Springfield	— 1.5	1875	Williamstown	—12		63
Do	Boston	2.9	Boston	2	1875	New Bedford	0		58
Michigan	Alpena	—15.7	Alpena	—19	1884	Fort Brady	—32	1875	60
Do	Escanaba	—24.7	Escanaba	—26.8	1884	Fort Mackinac	—19		35
Minnesota	Saint Paul	— 5.8	Saint Paul	—22.5	1873	Fort Snelling	—24		53
Do	Moorhead	—15.5	Breckenridge	—32	1873	Fort Ripley	—37		18
Mississippi	Vicksburg	27.0	Vicksburg	27	1876	Vicksburg	25		4
Missouri	Saint Louis	13.1	Saint Louis	6	1873, 1876	Saint Louis	— 6		39
Montana	Fort Custer	6.5	Fort Custer	—23	1880	Fort Ellis	—36		14
Do	Fort Benton	17.5	Fort Benton	—42	1876	Fort Benton	—42	1876	12
Nebraska	Omaha	9.1	Omaha	— 7	1880	Glendale	—20		2
Do	North Platte	9.6	North Platte	—21	1880	Bellevue	—15		11
Nevada	Winnemucca	19.2	Winnemucca	— 3	1882	Camp Halleck	— 8	1880	12
New Hampshire	Mount Washington	—47.8	Mount Washington	—34	1883	Dartmouth College	—23		18
New Jersey	Sandy Hook	7.4	Sandy Hook	6.9	1884	Paterson	0		9
Do	Cape May	10.8	Cape May	9	1873	Newark	2		18
New Mexico	Santa Fé	22.0	Santa Fé	0	1880	Fort Union	—12	1880, 1882	32
Do	Lava	21.0	La Mesilla	19	1881, 1882	Santa Fé	8		25
New York	Albany	— 5.5	Albany	— 4	1875	Albany	—12		55
Do	Oswego	— 9.6	Oswego	— 2.5	1875	Madison Barracks	—36		57
North Carolina	Wilmington	20.2	Wilmington	20	1873	Fort Johnson	14		58
Do	Fort Macon	24.2	Fort Macon	25.6	1884	Fort Macon	25		16
Ohio	Cincinnati	6.2	Cincinnati	1	1873	Cincinnati	— 4		36
Do	Cleveland	— 4.4	Cleveland	— 2	1873	Marietta	—10		53
Oregon	Portland	33.0	Portland	25.5	1880	Camp Harney	— 3		6
Do	Roseburg	29.3	Roseburg	19	1880	Astoria	19		20
Pennsylvania	Philadelphia	0.5	Philadelphia	6	1873	Philadelphia	5		113
Do	Pittsburg	4.9	Pittsburg	2	1873, 1877	Allegheny Arsenal	— 4		32
Rhode Island	Block Island	8.6	Newport	8.9	1883	Fort Adams	— 6		44
Do	Point Judith	5.0	New Shoreham	10	1883, 1884	Providence	— 4		35
South Carolina	Charleston	33.5	Charleston	25	1873	Charleston	31		105
Do						Fort Moultrie	25		38
Tennessee	Knoxville	17.3	Knoxville	6	1873	Humboldt	— 5?	1876	11
Do	Memphis	—20.2	Memphis	18	1876	Glenwood Cottage	11		11
Texas	Galveston	43.2	Galveston	34	1875	San Antonio	29		28
Do	Fort Elliott	18.0	Fort Elliott	— 2	1880	Fort Davis	9		23
Utah	Salt Lake City	24.3	Salt Lake City	4	1874	Fort Douglas	0		12
Vermont			Burlington	— 4	1873	Randolph	—27		5
Virginia	Norfolk	20.0	Norfolk	15.5	1873	Fortress Monroe	13		58
Do	Lynchburg	17.4	Lynchburg	6	1873	Alexandria	16		12
Washington Territory	Olympia	30.0	Olympia	23	1880	Fort Colville	—20		20
Do	Dayton	28.8	Dayton	8	1880				
West Virginia			Morgantown	0.5	1873	Weston	2	1876	3
Wisconsin	Milwaukee	— 4.3	Milwaukee	— 8.5	1884	Milwaukee	— 7		11
Do	La Crosse	— 3.0	La Crosse	—23	1873	Fort Crawford	—23		26
Wyoming	Cheyenne	3.1	Cheyenne	—17	1880	Fort Bridger	—29		20

Palermo, Oswego county: mean temperature, 17°.1, is 10°.6 below the March average for the last thirty-two years, and is the lowest for that period.

Cooperstown, Otsego county: mean temperature, 18°.3, is the lowest recorded in March since 1850, and is 10°.2 below the average for thirty-five years; the next lowest mean (19°.5) was that for 1872.

Ohio.—Cleveland: mean temperature, 25°.6, is the lowest recorded in thirty years with the exception of that for 1856, which was 0°.7 lower.

Wauseon, Fulton county: mean temperature, 24°.5, is 8°.3 below the March average for the last fifteen years.

Pennsylvania.—Dyberry, Wayne county: mean temperature, 19°.5, is 9°.4 below the March average for the last twenty years.

Wellsboro, Tioga county: mean temperature, 22°.4, is the coldest by 4°.5 that has occurred during the last thirty years.

Quakertown, Bucks county: mean temperature, 26°.4, is 9°.6 below the March average for the last nine years.

Wilkes Barre: mean temperature, 25°.6, is 8°.6 below the March average for the last fifteen years.

Rhode Island.—Providence: mean temperature, 26°.4, is 7° below the March average for the last fifty-one years.

Texas.—New Ulm, Austin county: mean temperature, 58°.0, is the lowest recorded in March during the last thirteen years, and is 5°.2 below the average for the same period.

Vermont.—Burlington: mean temperature, 19°.3, is the lowest recorded in March for many years.

Woodstock, Windsor county: mean temperature, 17°.8, is 7°.4 below the March average for the last eighteen years. The highest March mean in that period, 33°.3, occurred in 1871: the lowest, 16°.8, occurred in 1872.

Virginia.—Wytheville, Wythe county: mean temperature, 37°.0, is 5°.6 below the March average for a period of twenty years.

Variety Mills, Nelson county: mean temperature, 37°.1, is 7°.9 below the March average for the last eight years, and is the lowest for that period.

Bird's Nest, Northampton county: mean temperature, 40°.1, is, with the exception of that for March, 1872 (37°.6), the lowest recorded during the last sixteen years.

West Virginia.—Helvetia, Randolph county: mean temperature, 32°.6, is 7°.6 below the March average for the last nine years.

FROSTS.

The dates on which frost occurred during March in the various districts are as follows:

New England.—1st to 31st.

Middle Atlantic states.—1st to 31st.

South Atlantic states.—2d, 3d, 6th to 10th, 14th, 16th to 26th, 29th, 30th, 31st.

Florida peninsula.—Sanford and Mayport, 10th; Newport, 9th, 10th, 11th, 17th, 24th.

East Gulf states.—2d, 3d, 4th, 6th to 11th, 14th, 16th, 17th, 19th to 24th, 29th, 30th.

West Gulf states.—1st, 2d, 3d, 5th, 6th, 7th, 9th, 10th, 15th, 16th, 18th, 20th, 22d, 23d, 29th.

Tennessee.—2d, 3d, 6th to 11th, 14th to 26th, 29th, 30th.

Ohio valley.—Daily, except 12th.

Lower lake region.—Daily, except 1st, 27th, and 31st.

Upper lake region.—1st to 31st.

Extreme northwest.—1st to 31st.

Upper Mississippi valley.—1st to 31st.

Missouri valley.—1st to 31st.

Northern slope.—Daily, except 16th, 23d, and 26th.

Middle slope.—Daily, except 29th.

Southern slope.—Fort Davis, Texas, 2d; Fort Concho, Texas, 2d, 22d, 29th.

Southern plateau.—1st to 10th, 12th to 16th, 18th, 22d, 26th to 29th, 31st.

Middle plateau.—Daily, except 18th.

Northern plateau.—1st to 9th, 12th to 21st, 23d, 24th, 25th, 27th, 28th.

North Pacific coast region.—1st to 4th, 6th, 7th, 8th, 12th, 16th, 17th, 18th, 22d to 31st.

Middle Pacific coast region.—Sacramento, 1st, 3d, 11th, 14th; Princeton, 1st, 2d, 24th; Oakland, 3d; San Rafael, 1st, 2d.

ICE.

Ice formed in the southern parts of the country as follows:

Arkansas.—Lead Hill, 2d, 7th, 8th, 9th, 16th, 17th, 18th, 20th to 23d, 29th.

Florida.—Pensacola, 23d.

Georgia.—Augusta, 24th; Athens, 8th, 9th, 10th, 20th, 22d, 23th, 24th.

PRECIPITATION.

[*Expressed in inches and hundredths.*]

The distribution of rainfall over the United States and Canada, for the month of March, 1885, as determined from reports from more than seven hundred stations, is exhibited on chart iii.

In the following table are shown, for each of the geographical districts, as deduced from Signal Service observations, the average March precipitation for a series of years; the average for March, 1885, and the departures from the normal.

Average precipitation for March, 1885.

Districts.	Average for March Signal-Service observations.		Comparison of March, 1885, with the average for several years.
	For several years.	For 1885.	
	Inches.	*Inches*	*Inches.*
New England	4.52	1.84	−2.68
Middle Atlantic states	4.45	1.44	−3.01
South Atlantic states	5.37	1.05	−4.32
Florida peninsula	2.34	3.31	+0.97
Eastern Gulf states	6.56	4.13	−2.43
Western Gulf states	4.01	3.06	−0.95
Rio Grande valley	1.17	0.98	−0.19
Tennessee	6.14	2.57	−3.57
Ohio valley	3.88	0.86	−3.02
Lower lake region	2.98	0.96	−2.02
Upper lake region	2.25	1.38	−0.87
Extreme northwest	1.17	0.35	−0.82
Upper Mississippi valley	2.53	0.39	−2.14
Missouri valley	1.48	0.23	−1.25
Northern slope	0.81	0.70	−0.11
Middle slope	0.61	0.86	+0.25
Southern slope	0.87	3.04	+2.17
Southern plateau	1.03	1.06	+0.03
Middle plateau	1.48	0.42	−1.06
Northern plateau	1.44	0.33	−1.11
North Pacific coast region	5.45	0.47	−4.98
Middle Pacific coast region	3.54	0.36	−3.18
South Pacific coast region	1.69	0.27	−1.42
Mount Washington, N. H.	6.75	0.95	−5.80
Pike's Peak, Colo.	1.98	0.88	−1.10

From the above table it will be seen that the precipitation for March, 1885, has been below the average in nearly all districts. Over an area extending from the lower Rio Grande valley northwestward to eastern Arizona, and at a few isolated stations, (principally along the Gulf coast and in the northern part of the upper lake region) the precipitation has been above the average. At Jacksonville, Florida, and San Antonio, Texas, the excess exceeded 2.00, and at Fort Stockton, Texas, it was more than 7.00. The large excess at the station last named was due to the exceptionally heavy rains on the 14th and 15th, when 6.25 fell. At Jacksonville, Florida, the precipitation for the month was nearly double the average. At other stations where the precipitation was excessive, the departures were small. As in the preceding month the most marked feature in connection with the precipitation was the extensive area of deficiency, which included all of the country with the exceptions named above. In all districts east of the Mississippi river, (except Florida and the upper lake region), and also in the north and middle Pacific coast regions the deficiencies averaged above 2.00. In the districts where the largest deficiences occurred the monthly precipitation as compared with the average was as follows: New England, less than one-half; Tennessee, lower lake region, extreme northwest and middle Atlantic states, about one-third; south At-

lantic states, less than one-fifth; Gulf states, from two-thirds to three-fourths; Ohio valley, less than one-fourth; upper Mississippi and Missouri valleys, less than one-sixth; north and middle Pacific coast region, less than one-tenth; and on the south Pacific coast about one-sixth.

Table of excessive and greatest monthly precipitation, March, 1885.

Station.	Specially heavy.		Largest monthly.	Station.	Specially heavy.		Largest monthly.
	Date.	Amt.	Amount.		Date.	Amt.	Amount.
Alabama.				*Louisiana.*			
Mount Vernon B'k	21	2.10	7.89	New Orleans	21	2.24	6.99
Do	26 to 29	4.54		New Iberia	21	2.55	6.43
Mobile			6.36	Luling	20, 21	2.55	
Clintonville	27, 28	4.12	6.21	Point Pleasant	25	2.01	
Edwardsville	27, 28	2.93		Do	28	3.01	
Gadsden	27, 28	2.55		Donaldsonville	21	2.10	
Jacksonville	27, 28	3.00		Mandeville	21	2.35	
Newton	27, 28	2.60		*North Carolina.*			
Florida.				Kitty Hawk	22	2.17	
Fort Barrancas	21	4.75	8.55	*Tennessee.*			
Sanford	21, 22	2.21		Greenville	27, 28	2.30	
Jacksonville	21, 22	2.59		*Texas.*			
Newport	28	2.04		Fort Stockton	14, 15	6.25	7.78
				Huntsville	15	2.50	

DEVIATIONS FROM AVERAGE PRECIPITATION.

The departures exhibited by reports from the regular Signal Service stations are shown in the table of average precipitation for the several districts and in the table of miscellaneous meteorological data. The following notes in connection with this subject are reported by voluntary observers:

Arkansas.—Lead Hill, Boone county: monthly precipitation, 3.60; the average for March for the three preceding years is 3.66.

California.—Hydesville, Humboldt county: monthly precipitation, 0.24, is the smallest that has occurred in March for several years; it is nearly 7.00 below that for March, 1884.

Connecticut.—Hartford: monthly precipitation, 0.93, is 3.51 below the March average for the last thirteen years, and is the smallest that has occurred in March during that period.

Dakota.—Webster, Day county: monthly precipitation, 0.71, is considerably below the average for March.

Georgia.—Milledgeville: monthly precipitation, 3.32, is 5 55 below the average for March.

Illinois.—Mattoon, Coles county: monthly precipitation, 0.58, is 3.15 below the March average for the last five years.

Anna, Union county: monthly precipitation, 1.43, is 2.67 below the March average for the last ten years.

Swanwick, Perry county: monthly precipitation, 0.82, is 2.40 below the March average for the last three years.

Riley, McHenry county: monthly precipitation, 0.20, is the least recorded during the last twenty-four years, the smallest previously recorded being 0.89; the average for March during the period above named is 2.64.

Peoria, Peoria county: monthly precipitation, 0.24, is 2.44 below the March average for the last thirty years.

Sycamore, DeKalb county: monthly precipitation, 0.55, is 1.96 below the March average for the three preceding years.

Indiana.—Vevay, Switzerland county: monthly precipitation, 1.58, is 2.45 below the March average for the last twenty-one years. During the month snow fell to a depth of seven inches, which exceeds by four inches the average snowfall for March.

Sunman, Ripley county: monthly precipitation, 0.35, is the least recorded in March for several years.

Spiceland, Henry county: monthly precipitation, 0.72, is 3.14 below the March average for the last twenty-five years. The monthly snowfall, five inches, is one-half inch below the average for the same period.

Kansas.—Independence, Montgomery county: monthly precipitation, 1.31, is 0.82 below the March average for the last thirteen years.

Wellington, Sumner county: monthly precipitation, 2.02, is 0.58 in excess of the March average for the last seven years.

Yates Centre, Woodson county: monthly precipitation, 1.16, is 0.15 below the March average for the last five years.

Lawrence, Douglas county: monthly precipitation, 0.87, is 1.34 below the March average for the last seventeen years.

Maine.—Gardiner, Kennebec county: monthly precipitation, 2.18, is 0.70 below the March average for a period of forty-nine years.

Maryland.—Fallston, Harford county: monthly precipitation, 1.44, is 3.34 below the March average for the last fourteen years.

Massachusetts.—Somerset, Bristol county: monthly precipitation, 1.14, is 3.95 below the March average.

Worcester, Worcester county: monthly precipitation, 0.90, is 2.77 below the March average for a period of forty-seven years.

Nevada.—Carson City: monthly precipitation, 0.31, is 1.87 below the March average.

New Hampshire.—Contoocook, Merrimack county: monthly precipitation, 0.82, is nearly 3.00 below the March average.

New Jersey.—Moorestown, Burlington county: monthly precipitation, 1.08, is 2.44 below the March average for the last twenty-two years, and is the least by 0.34 that has occurred during that period.

South Orange, Essex county: monthly precipitation, 0.81, is the least that has been recorded during the last fifteen years, and is 2 89 below the average.

New York.—North Volney, Oswego county: monthly precipitation, 0.90, is 2.11 below the average for the last thirteen years, and is the least, by 1.10, that has occurred during that period.

Palermo, Oswego county: monthly precipitation, 0.68, is 2.34 below the March average for the last thirty-two years. The monthly snowfall, six and one-half inches, is eight inches below the March average.

Ohio.—Wauseon, Fulton county: monthly precipitation, 0.62, is 2.68 below the March average for the last twelve years. The monthly snowfall, five inches, is less than one-half of the March average.

Pennsylvania.—Dyberry, Wayne county: monthly precipitation, 1.03, is 1.99 below the March average for the last seventeen years. The snowfall, twelve inches, is three inches below the March average for a period of thirty-one years.

Rhode Island.—Providence: monthly precipitation, 1.02, is 3.00 below the March average for a period of fifty-four years, and, with the exception of that of March, 1855, is the least recorded in that period.

Texas.—New Ulm, Austin county: monthly precipitation, 2.14, is 3.24 below the March average for the last thirteen years, and is the least recorded in March during that period; the largest, 13.13, occurred in 1883.

Virginia.—Wytheville, Wythe county, monthly precipitation, 1.49, is 2.15 below the March average for a period of twenty years.

Variety Mills, Nelson county: monthly precipitation, 1.22, is 3,13 below the March average for the last six years.

West Virginia.—Helvetia, Randolph county: monthly precipitation, 2.54, is 2.46 below the March average for the last nine years.

SNOW.

The dates on which snow fell in the various districts are as follows:

New England.—Daily, except 6th, 11th, 22d, and 23d.

Middle Atlantic states.—Daily, except 5th, 11th, 21st, 26th, and 27th.

South Atlantic states.—8th, 17th to 20th, 22d, 23d, 29th.

East Gulf states.—Birmingham, Alabama, 8th.

West Gulf states.—Lead Hill, Arkansas, 7th, 8th.

Tennessee.—6th, 7th, 8th, 15th, 17th, 18th, 19th, 21st, 22d, 28th.

Ohio valley.—1st, 2d, 3d, 6th to 25th, 28th, 29th.

Lower lake region.—Daily except 22d, 26th, and 27th.

Upper lake region.—Daily, except 8th and 21st.

Extreme northwest.—Daily, except 9th, 16th, 28th, and 31st.

Upper Mississippi valley.—1st, 3d to 8th, 12th to 18th, 20th, 21st, 22d, 24th, 27th to 30th.

Missouri valley.—1st, 3d to 8th, 14th to 24th, 27th, 28th, 29th.

Northern slope.—2d to 7th, 12th, 14th to 18th, 20th to 24th, 26th to 29th.

Middle slope.—3d, 4th, 6th, 11th, 12th, 15th, 16th, 17th, 20th to 28th.

Southern plateau.—Santa Fé, New Mexico, 1st, 14th, 18th, 20th, 21st; Gallinas Springs, New Mexico, 20th, 21st.

Middle plateau.—10th to 13th, 21st to 24th, 26th.

The following notes relate to the severest snow-storms of the month.

Mackinaw City, Michigan: the heavy snow and high winds on the 14th caused blockades on the railroads; all trains were delayed; the snow blockade continued on the 15th.

Mackinaw City, Michigan: on the 24th trains were delayed from four to twelve hours on account of snow blockades.

Grand Haven, Michigan: reports from the northern and central parts of the state on the 15th stated that the snow-storm of the 14–15th was very heavy. At Petoskey, Emmett county, the snow drifts were from two to three feet deep. The storm was also equally as severe at Sheboygan and Tawas City.

Yorkville, York county, South Carolina: snow fell to a depth of ten inches at this place during the night of the 17–18th.

Pickens, Pickens county, South Carolina: snow fell to a depth of eight inches during the night of the 17–18th; in places it drifted to a depth of twelve inches.

Kitty Hawk, North Carolina: the heaviest snowfall that has been known here for a number of years occurred on the 18th. In places along the beach snow drifted to depths of from two to four feet; the average of several measurements at 7 a. m. was six inches. Reports from Roanoke Island stated that at that place the snow fell to a depth of two feet. The snowflakes, which were very moist, stuck to the sides of buildings and weighed down trees and shrubbery. From 1 a. m. until daylight, during the storm, there was an almost incessant display of lightning.

Woodstock, New Brunswick: the severest snow-storm of the season prevailed on the 19th; snow fell to a depth of sixteen inches, blockading nearly all railway lines.

Saint John, New Brunswick: the snow-storm of the 19th was very severe, snow fell to a depth of nearly two feet; all railroads were obstructed.

Halifax, Nova Scotia: reports from Yarmouth on the 20th stated that the snowfall for the forty-eight hours preceding that date, was unusually heavy, and rendered the highways and railroads impassable; the snow-storm continued on the 20th.

Oswego, New York: the snow-storm of the 21st caused delay of trains on the Rome, Watertown and Ogdensburg railroad. Near Richland the snow drifts were reported to have been seven feet deep.

Danville, Virginia: on the 22d a heavy snow-storm prevailed in this section, the snow falling to a depth of ten inches.

Petersburg, Virginia: a heavy snow-storm set in during the early morning of the 22d; snow fell to a depth of eight inches.

Norfolk, Virginia: the heaviest snowfall known for several years occurred on the 22d; snow fell to a depth of four inches and six tenths, which is the greatest depth that has fallen at any time in March since this station was opened.

London, Ontario: on the 24th, the most serious snow blockade of the season obstructed the London, Huron and Bruce railroad.

Hartford, Connecticut: the snowfall of the 29th was the heaviest of the winter.

MONTHLY SNOW-FALLS.

[*Expressed in inches and tenths.*]

Monthly snow-falls of three inches or more were reported from the various states and territories during the month as follows:

Colorado.—Pike's Peak, 13.5; Pueblo, 4.

Connecticut.—North Colebrook, 18; Norfolk, 11.2; Bethel, 6.6; New Haven and New London, 6.2; Hartford, 5.5; Voluntown, 4.2.

Dakota.—Deadwood, 32.5; Webster, 4.9.

District of Columbia.—Washington City, 3.8; West Washington, 3.2.

Illinois.—Anna, 7; Golconda, 6.5; Marion, 6.4; McLeansboro, 5.5; Mascoutah, 4.4; Sandwich, 4; Chicago, 3.6; Fairfield and Sycamore, 3.5; Bunker Hill, 3.4; Pana and Swanwick, 3.

Indiana.—Logansport, 9.6; Huntingburgh, 7.5; Princeton, Farmland, and Vevay, 7; Blue Lick and La Grange, 5.8; Salem, 5.6; Marengo, Wabash, and Spiceland, 5.[illegible]; Mauzy, 5.4; Degonia Springs, 5; Indianapolis, 4.6; Knightstown, 4.2; Greencastle, 4.1; Fort Wayne, 4; Guilford, 3.9; Miami and Monticello, 3.5; La Fayette, 3.4; Connersville, 3.3; Laconia, 3.2; Corydon and Franklin, 3.

Iowa.—West Union, 8.7; Cresco, 6.5; Dubuque, 6.1; Independence, 5.4; Logan, 3.

Kansas.—Wyandotte, 4.8; Lawrence, 4; Clay Center, 3.8; Atchison, 3.2; Holton, 3.

Kentucky.—Frankfort, 4.3; Louisville, 4.2.

Maine.—Eastport, 17.4; Cornish, 17; Orono, 15; Gardiner and Portland, 11; Waterville, 7.5.

Maryland.—Fallston, 6.6; Cumberland, 6; Baltimore, 5.9.

Massachusetts.—Rowe, 20; Princeton and Deerfield, 11; Boston, 9.5; Amherst, 9; Westborough, 7.8; Williamstown, 6.5; Leicester, 5.5; Somerset, 5.2; Fall River, 5; Worcester, 4.8; Milton, 4.5; Taunton, 4.5; New Bedford, 4; Readville, 3.1.

Michigan.—Manistique, 29.8; Marquette, 25.6; Boyne, 23.8; Traverse City, 20.1; Mackinaw City, 19.4; Escanaba, 16.7; Thornville, 15.5; Harrisonville, 14.8; Alpena, 13.2, Moorestown, 12.5; Ann Arbor, 10.8; Ionia, 9.7; Kalamazoo, 8.5; Detroit, 7.7; Lansing, 6.4; Northport, 5.9; Swartz Creek, 5; Grand Haven, 4.7; Port Huron, 3.2.

Minnesota.—Chester, 8.5; Northfield, 8.1; Duluth, 7.9: Minneapolis, 6.4; Saint Vincent, 5.5; Saint Paul, 3.8; Moorhead, 3.2.

Missouri.—Springfield, 6.0; Lamar, 4.8; Pierce City, 3.5.

Montana.—Fort Custer, 8.3; Fort Maginnis, 6.8.

Nebraska.—Genoa, 4.4; Madison, 4.2; Nebraska City, 4; North Platte, 3.7; Ogalalla and Tecumseh, 3.5; Weeping Water, 3.

New Hampshire.—Contoocook, 9.5; Mount Washington, 7.4.

New Jersey.—Dover, 8.4; Somerville, 6.5; South Orange, 6.2; Phillipsburg, 6; Cape May, 5.5; Moorestown, 5.

New Mexico.—Santa Fé, 8.2.

New York.—Humphrey, 15.2; Cooperstown, 10; Mountainville, 9.8; Buffalo, 7.3; Ithaca, 7.1; Auburn, 7; Menand Station, 6.6; Palermo, 6.5; New York City, 5.9; Le Roy, 5.2; Albany, 4.7; Rochester, White Plains, and Factoryville, 3.5; Oswego, 3.1.

North Carolina.—Charlotte, 11.7; Chapel Hill, 9.5; Weldon, 8.5; Statesville, 5.5; Lenoir, 5.

Ohio.—Garrettsville, 10.5; Hiram, 9.5; Wauseon, 5.1; Portsmouth, 4.8; Ruggles and Sandusky, 4.5; Tiffin, 4; North Lewisburg, 3.5; College Hill, 3.

Pennsylvania.—Grampian Hills and Erie, 14; Dyberry, 12; Leetsdale, 11.8; Easton and South Bethlehem, 10; Quakertown, 9.5; Wellsboro, 8.5; Wilkes Barre, 8.1; Germantown, 8; Blooming Grove, West Chester, and Pittsburg, 7.5; Catawissa, 7.4; Troy, 7.2; Chambersburg, 5.9; Drifton, 5.5; Mahanoy Plane, 4.5; Haverford College, 3.3; Philadelphia, 3.2.

Rhode Island.—Providence, 3.8.

South Carolina.—Pacolet, 11.

Tennessee.—Milan, 12; Beech Grove, 11; Ashwood, 9.8; Trenton, 9.5; Florence, 9.2; Henderson, 9; Manchester, 8.2; Dyersburg, Dresden, and Flat Creek, 8; Farmingdale, 7.6; Sweet Water and Hardison's Mills, 7.5; Pulaski, 7; McKenzie, Paris, and Savannah, 6.8: Hurricane Swith, and Dickson, 6.2; Grief, Fostoria, and Howell, 6; Knoxville, 5.5; Covington, 4.2; Austin, 3.8; Bolivar, 3.6; Riddleton, 3.4; Parksville, 3.

Utah.—Promontory, 8.5.

Vermont.—Lunenburgh, 22; Strafford, 20.5; Woodstock, 20; Newport, 19.5; Dorset, 14.2; Burlington, 9; Charlotte, 5; Post Mills, 4.

Virginia.—Bird's Nest, 9.0; Norfolk, 6.4; Bruington, 6; Marion, 5; Blacksburg, 4; Cape Henry, 3.9; Dale Enterprise, 3.5.

West Virginia.—Helvetia, 17.8; Wellsburg, 8.5.

Wisconsin.—Embarras, 10.8; Franklin, 10; Neillsville, 9.5; Sussex, 8.8; Manitowoc, 7.0; Madison, 5.3; La Crosse, 3.6.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF THE MONTH.

[*Expressed in inches and tenths.*]

Colorado.—Pike's Peak, 8.

Connecticut.—North Colebrook, 9; Norfolk, 4; Hartford, trace.

Dakota.—Fort Buford, trace.

Iowa.—Guttenburg, trace.

Kansas.—Atchison, trace.

Maine.—Gardiner, 20; Orono, 12; Eastport, 10; Waterville, 3; Portland, trace.

Maryland.—Fallston, trace.

Massachusetts.—Rowe, 26; Deerfield, 10.5; Leicester, 1; Williamstown, drifts; Boston, Amherst, Princeton and Readville, trace.

Michigan.—Marquette, 41; Mackinaw City, 36; Boyne, 30; Manistique, 29; Moorestown, 25; Traverse City, 15; Swartz Creek, 10; Grand Haven, 7; Ionia, 6; Northport, 3.2; Alpena, 3; Port Huron, 1.5; Ann Arbor, 0 to 12; Detroit, 0 to 2; Escanaba, trace.

Minnesota.—Saint Vincent, 3; Duluth, 1; Saint Paul and Northfield, trace.

Montana.—Fort Maginnis, trace.

New Hampshire.—Mount Washington, 24; Contoocook, 9.

New Mexico.—Santa Fé, 30 inches in mountains, none in valleys.

New York.—North Volney, 18; Palermo, 11; Humphrey, 8; Penn Yan, 6; Le Roy, 4 to 6; Cooperstown, 2.5; Oswego, Auburn, and Rochester, drifts; Albany, Buffalo, Ithaca, Menand Station, and Mountainville, trace.

Ohio.—Ruggles, drifts; Toledo, Wauseon, and Hiram, trace.

Pennsylvania.—Grampian Hills, 12; Dyberry, 7; Wellsboro, 4.5; Mahanoy Plane, 4; Chambersburg, Catawissa, Quakertown, Wilkes Barre, Troy, and Drifton, trace.

Vermont.—Woodstock and Charlotte, 18; Post Mills, 12; Dorset, 11; Burlington, 4; Strafford, 3.

Wisconsin.—Embarras, 16; Neillsville, 4; La Crosse, trace.

SLEET.

Colorado.—Pike's Peak, 25th, 26th.

Dakota.—Yankton, 3d; Webster, 3d, 27th.

Georgia.—Atlanta and Augusta, 18th.

Indiana.—Sunman, 30th; Indianapolis, 1st, 3d, 6th, 7th, 10th.

Iowa.—Dubuque, 1st; Guttenburg, 5th.

Kansas.—Independence, 16th.

Maryland.—Emmitsburg, 12th.

Minnesota.—Duluth, 31st; Saint Vincent, 13th; Fort Snelling, 3d.

Missouri.—Lamar, 21st.

Montana.—Fort Assinaboine, 2d.

New York.—Rochester and Oswego, 15th.

North Carolina.—Smithville, Wilmington, and Scott's Hill, 18th; Charlotte, 23d.

Ohio.—Cincinnati, 10th; Cleveland, 30th.

Tennessee.—Nashville, 22d; Memphis, 17th, 21st, 22d.

HAIL.

Hail is reported to have fallen in the following states and territories:

Alabama.—Birmingham and Greensboro, 12th.

Arizona.—Fort Bowie, 12th; Fort Apache, 14th; Prescott, 24th, 25th.

Colorado.—Montrose, 12th, 22d, 26th, 27th.

Dakota.—Fort Yates, 3d; Fort Randall, 5th; Fort A. Lincoln, 29th; Fort Meade, 27th, 29th.

Georgia.—Athens, 27th.

Illinois.—Riley, 14th; Anna, 28th.

Indiana.—Vevay, 14th, 29th; LaFayette, 30th.

Kansas.—Sherlock, 23d.

Louisiana.—Liberty Hill, 27th; Point Pleasant, 28th.

Montana.—Fort Benton, 4th.

Nevada.—Carson City, 18th.

New Mexico.—Lava, 1st.

Ohio.—Yellow Springs, 14th; Garrettsville, 30th.

Oregon.—Lakeview, 10th; Fort Klamath, 10th.

Tennessee.—Nashville, 6th.

Texas.—Fort Stockton, 14th; Cleburne, 11th; Fort Davis, 1st, 10th.

Wisconsin.—Embarras and Sussex, 14th.

PRECIPITATION FROM A CLOUDLESS SKY.

Key West, Florida: from 9.10 to 9.23 p. m. on the 7th light rain fell when no clouds were visible except along the southern horizon and below an altitude of 30°.

Hiram, Portage county, Ohio: snow fell from a clear sky on the evening of the 10th.

Bloomington, Illinois: shortly after midnight of the 14–15th, when the sky was entirely clear, snow fell for about thirty minutes, covering the ground to the depth of about three-fourths of an inch.

WINDS.

The most frequent directions of the wind during March, 1885, are shown on chart ii. by arrows flying with the wind. In the upper Mississippi and Missouri valleys, east Gulf states, and Tennessee they were from the northwest; in the lake region, Ohio valley, and on the Atlantic coast they were generally from the northwest to southwest; in the west Gulf states, Rocky mountain regions, and on the Pacific coast they were variable.

HIGH WINDS.

(In miles per hour.)

During the month of March velocities of fifty or more miles per hour were recorded at stations as follows:

On the summit of Mount Washington, New Hampshire, 84, sw., 1st; 68, nw., 2d; 62, nw., 5th; 62, nw., 6th; 80, nw., 9th; 92, w., 10th; 84, nw., 11th; 76, nw., 12th; 56, w., 14th; 80, sw., 15th; 76, w., 16th; 72, w., 17th; 116, nw., 20th; 128, nw., 21st; 88, nw., 22d; 68, nw., 24th; 68, w., 25th; 50, w., 26th; 80, sw., 27th; 71, w., 28th; 76, n., 29th; 70, n., 30th; 83, w. and sw., 31st.

Pike's Peak, Colorado, 58, w., 4th; 72, nw., 6th; 52, w., 17th; 52, w., 22d; 50, n., 28th; 64, w., 29th; 53, w., 30th.

Cape Mendocino, California, 56, se., 8th; 56, se., 17th.

Sandy Hook, New Jersey, 53, nw., 10th.

Fort Buford, Dakota, 58, w., 2d.

Fort Shaw, Montana, 53, w., 15th.

Rochester, New York, 52, w., 15th.

Buffalo, New York, 56, sw., 9th; 56, sw., 15th.

Kitty Hawk, North Carolina, 52, ne., 22d.

Fort Macon, North Carolina, 60, sw., 29th.

Tatoosh Island, Washington Territory, 50, e., 7th.

LOCAL STORMS AND TORNADOES.

Navo, Denton county, Texas: a tornado occurred at this place at 5 p. m. on the 11th; no persons were killed, but several were injured; five dwellings, a store, and numerous out-buildings were destroyed. The tornado cloud moved in a northeasterly direction.

Gainesville, Cooke county, Texas: a tornado occurred eight miles southeast of this place at 4 p. m. on the 11th; its path was from 1,320 to 2,640 feet in width. Two dwellings, together with much fencing were destroyed. The tornado moved in a northeasterly direction; it was preceded by a thunder-storm, and was accompanied by hail and rain.

Van Alstyne, Grayson county, Texas: at eight p. m. on the

11th, a tornado occurred seven miles south of this place. The tornado cloud was funnel-shaped and the direction of movement was easterly, its path being about one hundred and fifty feet in width. No loss of life occurred, but several persons were injured. Five freight cars were blown from the railroad track and destroyed.

Zion, Lowndes county, Mississippi: at 6.30 p. m. on the 12th, a tornado occurred near this place. The cloud was funnel-shaped and moved in an easterly direction, causing much damage to buildings, fences and timber. The tornado's path was ten miles long and its width nine hundred feet.

Pulaski, Giles county, Tennessee: a tornado passed over a portion of this town at 4.20 p. m. on the 12th. Its path was about one-half mile in length and one hundred feet wide. About twenty buildings were unroofed and many trees and fences were blown down.

Greenville, Muhlenburg county, Tennessee: a violent storm of rain and hail accompanied by thunder and lightning occurred between 8 and 9 p. m. on the 27th. About two inches of water fell in fifteen minutes; fields were badly washed.

At 3.45 p. m. on the 27th a tornado passed in an easterly direction through Mitchell county, Georgia, for a distance of about twenty-five miles; several persons were injured; five houses, several cabins, and much fencing were destroyed.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the table below are shown the danger points in the rivers at the various stations, the highest and lowest stages for March, 1885, with the dates of occurrence, and the monthly ranges:

Heights of rivers above low-water mark, March, 1885.

[*Expressed in feet and tenths*]

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, Louisiana	29 9	17	19 2	1, 2	16 8	2 4
Arkansas:						
Fort Smith, Arkansas	15 0	2	6 5	23	0 3	6 2
Little Rock, Arkansas	23 0	4	15 6	25, 26	8 7	6 9
Missouri:						
Yankton, Dakota‡	24 0	21	10 8	19	5 1	5 7
Omaha, Nebraska‡	18 0	10	12 2	20	8 4	3 8
Leavenworth, Kansas‡	20 0	16	12 2	24	9 8	2 4
Mississippi:						
Saint Paul, Minnesota†	14 5					
La Crosse, Wisconsin†	24 0					
Dubuque, Iowa†	16 0					
Davenport, Iowa†	15 0					
Keokuk, Iowa‡	14 0	14	14 5	30	6 1	8 4
Saint Louis, Missouri	32 0	16	24 2	1	7 6	16 6
Cairo, Illinois	40 0	18	31 6	1	16 2	15 4
Memphis, Tennessee	34 0	20, 21	24 0	1, 2	10 2	13 8
Vicksburg, Mississippi	41 0	27, 28	34 6	7, 8	22 5	12 1
New Orleans, Louisiana*	−3 0	28,29,30	− 3 5	10,11,13	− 6 2	2 7
Ohio:						
Pittsburg, Pennsylvania	22 0	3	8 9	26	2 0	6 9
Cincinnati, Ohio	50 0	6	25 6	31	9 7	15 9
Louisville, Kentucky	25 0	5 to 8	10 0	29	6 0	4 0
Cumberland:						
Nashville, Tennessee	40 0	19	13 5	12	7 1	6 4
Tennessee:						
Knoxville, Tennessee		16	6 0	25,26,30	2 3	3 7
Chattanooga, Tennessee	33 0	18	9 2	12	5 0	4 2
Monongahela:						
Pittsburg, Pennsylvania	29 0	3	8 9	26	2 0	6 9
Savannah:						
Augusta, Georgia	32 0	30	15 0	23 to 27	7 5	7 5
Mobile:						
Mobile, Alabama		17	18 0	14	15 0	3 0
Sacramento:						
Red Bluff, California		1 to 4	2 2	29, 31	1 4	0 8
Sacramento, California		1, 2	16 0	31	13 9	2 1
Willamette:						
Portland, Oregon		1	9 0	10	4 5	4 5
Colorado:						
Yuma, Arizona		24, 25	18 0	1, 2, 3	14 4	3 6

* Below high-water mark of 1874 and 1883. † Frozen the entire month. ‡ Frozen part of month—see text.

The Mississippi river remained frozen throughout the month at Davenport, Iowa, and to the northward; at Keokuk the ice gave way on the 14th, on which date the water rose to one-half foot above the danger line.

The Missouri river was frozen at Yankton, Dakota, from the 1st to 13th; at Omaha, Nebraska, from the 1st to 9th; and at Leavenworth, Kansas, from the 1st to 6th.

The Ohio river was at a comparatively low stage throughout the month.

The observer at Chattanooga reports that the water in the Tennessee river during the month has averaged lower than for any corresponding period of which there is a record; the stage of water has barely permitted steamboat navigation and has not been sufficient for rafting.

ICE IN RIVERS AND HARBORS.

Barnegat bay.—Barnegat City, New Jersey: the bay froze on the 20th and remained frozen until the 25th.

Casco bay.—Portland, Maine: the harbor was free from ice on the 31st.

Cedar river.—Cedar Rapids, Iowa: the ice broke up on the 24th.

Chincoteague bay.—Chincoteague, Virginia: the bay froze over on the 23d; the ice broke up on the 24th.

Connecticut river.—Hartford, Connecticut; the ice broke up opposite this city on the 28th; on the 30th the first steamer of the season arrived.

Delaware river.—Easton, Pennsylvania: the river froze over on the 21st for the first time during the winter; the Morris canal was also closed, and the Lehigh canal and river between this place and Mauch Chunk were covered with ice two inches thick. At this date in 1884 the Lehigh canal was open for navigation.

Des Moines river.—Des Moines, Iowa: the ice broke up on the 11th.

Ottumwa, Wapello county, Iowa: the ice broke up on the 4th.

Detroit river.—Detroit, Michigan: floating ice from 1st to 13th, 20th, 22d to 28th.

Eel river.—Logansport, Indiana: the ice began to break up on the 13th; floating ice continued until the 20th.

Gardiner bay.—New London, Connecticut: reports from the bay on the 24th stated that both entrances were filled with large masses of ice.

Genesee river.—Rochester, New York: the ice broke up and passed out of the river on the 31st, causing no damage.

Hudson river.—Menand Station, (near Albany) New York: ice formed continuously until about the 25th, when it was about three feet in thickness.

Poughkeepsie, New York: on the 30th the river was open as far north as New Hamburg, ten miles south of this place.

Newburg, New York: the tug "Conqueror," with barge "Homer," forced passage through the ice from New York City to this place on the 29th; this was the first arrival of the season.

West Point, New York: ice in river broke up on the 27th; the first steamer of the season arrived on the 30th.

Kansas river.—Manhattan, Riley county, Kansas: the ice in the river broke up on the 1st.

Lake Champlain.—Troy, New York: reports from the lake on the 28th stated that the ice was three feet thick.

Lake Michigan.—Milwaukee, Wisconsin: at the close of March the lake was covered with heavy ice, preventing navigation. The iron propeller "Michigan" was nipped by the ice and sunk on the 19th.

Grand Haven, Michigan: the harbor entrance continued blocked with ice during the entire month, and with the exception of the arrival and departure of the propeller "Wisconsin" on the 11th, navigation was suspended. The "Wisconsin" cleared Milwaukee for this port on the 16th and arrived within twenty-five miles of the eastern shore of the lake, where she firmly lodged in the ice; she drifted with the ice until the 20th when a large hole was stove in her side; three hundred tons of freight were thrown overboard in order to save the vessel. On the 31st the propeller had drifted to within eighteen miles of this port.

Manistique, Schoolcraft county, Michigan: on the 31st the ice in the harbor was sixteen inches thick, and the lake was

frozen solidly between this shore and Beaver island, a distance of about thirty miles.

Lake Ontario.—Rochester, New York: the lake was covered with ice on the 8th; on the 15th the high wind broke up the ice.

Lake Superior.—Duluth, Minnesota: the lake continued frozen throughout the month at this place.

Lehigh river.—South Bethlehem, Pennsylvania: on the 21st the river was frozen across for the first time during this winter; this was due to a low stage of water and absence of wind, as the temperature was not as low as it had been previously.

Little Egg Harbor.—Little Egg Harbor, New Jersey: navigation was suspended on account of ice on the 21st; the ice broke up on the 24th.

Mississippi river.—Saint Paul, Minnesota: the river remained frozen throughout the month.

La Crosse, Wisconsin: the ice began to break up at about noon on the 31st, leaving the river open for a distance of about three miles opposite this place.

Dubuque, Iowa: crossing the river on the ice by teams and pedestrians was discontinued on the 14th; on the 19th crossing on the ice was resumed; the ice moved a short distance on the 25th, also on the 27th and 28th; the ferry-boats made regular trips on the 30th; the ice dam gave way on the 31st, leaving the river open for a considerable distance above Eagle Point.

Burlington, Iowa: on the 14th the ice began to break up at the head of Rock Island; on the 26th the ice in front of Burlington moved about three hundred feet, and on the 27th it moved about five hundred feet. On the 31st the ice dam broke, leaving the river open. The steamer "Wes Rambo" arrived on the 31st.

Muscatine, Iowa: ice went out of river on 26th.

Keokuk, Iowa: on the 14th the ice broke up at 12.30 p. m., and by 5 p. m. the river was nearly free from ice. The steamer "Gem City," arrived on the 20th, being the first steamer of the season.

Cairo, Illinois: navigation between this city and Saint Louis was resumed on the 1st.

Missouri river.—Fort Buford, Dakota: a slight break in the ice occurred near the mouth of the Yellowstone on the 18th.

Fort Yates, Dakota: on the 30th the ice broke up and formed a dam below this place.

Fort Bennett, Dakota: the ice broke up on the 18th; floating ice on 19th, 20th, 26th to 29th, 31st; on the 20th it was reported that the ice had broken as far northward as the mouth of Cheyenne river.

Fort Sully, Dakota: the ice in river broke up on the 18th.

Yankton, Dakota: river opened the 14th.

Omaha, Nebraska: river opened on the 10th.

Leavenworth, Kansas: the ice began to break up on the 5th, ice dams formed on the 6th; the ice dams gave way on the 8th and 9th.

Mohawk river.—Schenectady, New York: on the 26th, the ice in the river was more than two feet thick.

Monongahela river.—Pittsburg, Pennsylvania: floating ice from 2d to 11th, 16th to 23d, 25th and 31st.

New Haven harbor.—New Haven, Connecticut: the harbor was free from ice and open for navigation on the 7th; on the 22d the harbor froze; on the 26th, the ice went out of the harbor.

New York harbor.—David's Island: the ice between the island and shore disappeared on the 26th.

North and East rivers.—New York City: large quantities of floating ice obstructed navigation on the 21st; floating ice continued on the 22d and 23d.

North Branch, Susquehanna river.—Catawissa, Pennsylvania: the ice broke up and moved out of the river on the 30th and 31st.

Ohio river.—Portsmouth, Ohio: floating ice from 1st to 7th; on the 2d navigation was open to all points between Pomeroy and Cincinnati.

Cincinnati, Ohio: the ice broke up on the 1st; floating ice from 2d to 5th, 8th and 9th; navigation to points southward was resumed on the 3d, and to points northward on the 6th.

Vevay, Indiana: on the 5th the river was free from ice and boats made regular trips; on the 9th the river was full of floating ice.

Louisville, Kentucky: ice broke up on the 1st; navigation was resumed on the 2d; floating ice continued from 2d to 5th.

Passamaquoddy bay.—Eastport, Maine: floating ice on 3d, 16th, 17th, 27th.

Potomac river.—Washington, District of Columbia: the ice was broken up by tugs on the 2d, when navigation was resumed; on the 21st the river was again frozen; the ice broke up on the 24th.

Republican river.—Red Willow, Red Willow county, Nebraska: the ice broke up on the 1st.

Rock river.—Beloit, Rock county, Wisconsin: the river was free from ice at the close of the month.

Rockford, Illinois: the ice went out of the river on the 27th and 28th.

Sandusky bay.—Sandusky, Ohio: the steamer "American Eagle" forced passage through the ice to Kelley's Island and returned on the 31st.

Sandusky river.—Tiffin, Seneca county, Ohio: the ice began to break up on the 4th.

Sandy Hook bay.—Sandy Hook, New Jersey: the bay was filled with ice on the 23d and 24th.

Scioto river.—Portsmouth, Ohio: the ice-dam gave way on the 2d, causing considerable damage.

Seneca lake.—Elmira, New York: the lake, which has not been frozen for many years, was frozen from shore to shore on the 4th. Cayuga lake, about fifteen miles distant, freezes every winter, but Seneca lake for more than thirty years has not been known to have more than a thin border of ice during the severest weather.

Susquehanna river.—Port Deposit, Maryland: on the 30th the ice began to weaken and considerable apprehension was entertained that a break up would result in a destructive freshet. Reports from Collinsville, Pennsylvania, on this date stated that ice began to move and had formed a dam at Marietta. The large ice-dam at McCall's Ferry moved slightly on the 29th.

Wabash river.—Logansport, Indiana: the ice began to break up on the 10th.

Miscellaneous.—Humphrey, Cattaraugus county, New York: the ice went out of the streams in this vicinity on the 31st.

FLOODS.

Keokuk, Iowa, 6th: the breaking up of the ice in the lower Des Moines river has caused the destruction of much property along its course. During the 5th and 6th extensive ice dams formed, which caused overflows in numerous places. All of the neighboring streams were much swollen. The levees on the Missouri side of the river broke on the 6th, flooding the neighboring low lands. A number of farm houses were also flooded and the occupants were forced to abandon them. Numerous bridges were destroyed; at Pittsburg, Van Buren county; a wagon bridge, built last year at a cost of $40,000, was carried away. In the northern part of Lee county the streams were so much swollen that travel was rendered very difficult. On the afternoon of the 8th a part of a bridge at Eddyville, Wapello county, was carried away. On the 10th the town of Alexandria, Clark county, Missouri (opposite Keokuk), was inundated to a depth of three feet, and the inhabitants were driven to the upper stories of their dwellings.

Saint Louis, Missouri, 19th: reports from Carroll, Lafayette, and Ray counties state that the recent thaw resulted in serious damage in those counties. In Carroll county the water inundated an area several miles in extent, and many farmers abandoned their homes, and it is reported that several lives were lost; the losses sustained were very heavy, the wheat crop having been entirely ruined.

The low lands in the vicinity of Waverly, Lafayette county,

were inundated to depths of from one to fifteen feet for a distance of six miles. Many residents were driven to the upper stories of their dwellings. It is estimated that the losses will amount to $100,000.

HIGH TIDE.

Eastport, Maine, 4th, 5th.

LOW TIDE.

New Haven, Connecticut, 11th.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; and the mean temperature of the air:

Temperature of water for March, 1885.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
	°	°	°		°
Atlantic City, New Jersey	44.5	29.8	14.7	3 6	31.4
Alpena, Michigan*					
Augusta, Georgia	56.4	41.0	15.4	8 9	49.5
Baltimore, Maryland	38.5	33.7	4.8	10 0	35.3
Block Island, Rhode Island	37.0	29.2	7.8	6 9	29.8
Boston, Massachusetts	33.2	29.2	4.0	21 4	27.9
Buffalo, New York*					
Canby, Fort, Washington Territory	53.8	44.9	8.9	15 8	49.5
Cedar Keys, Florida	67.5	59.8	7.7	9 3	58.7
Charleston, South Carolina	53.3	49.7	3.6	40 9	52.2
Chicago, Illinois*					
Chincoteague, Virginia †	40.6	24.0	16.6	3 4	35.7
Cleveland, Ohio*					
Detroit, Michigan*					
Duluth, Minnesota*					
Eastport, Maine	34.2	32.2	2.0	15 7	22.8
Escanaba, Michigan*					
Galveston, Texas	64.7	54.2	10.5	12 7	60.7
Grand Haven, Michigan*					
Indianola, Texas	66.9	54.6	12.3	8 3	60.5
Jacksonville, Florida	64.6	57.0	7.6	18 0	57.6
Key West, Florida	83.0	69.4	13.6	17 2	70.8
Mackinaw City, Michigan*					
Macon, Fort, North Carolina	55.3	42.8	12.5	5 1	45.3
Marquette, Michigan*					
Milwaukee, Wisconsin*					
Mobile, Alabama	58.5	49.0	9.5	16 7	53.5
New Haven, Connecticut ‡	38.4	30.0	8.4	16 0	26.9
New London, Connecticut	35.8	33.2	2.6	11 0	29 7
New York City	35.8	31.2	4.6	14 0	29.7
Norfolk, Virginia	45.9	35.0	10.9	16 4	40.8
Pensacola, Florida	59.7	56.0	3.7	17 1	54.8
Portland, Maine	33.3	30.1	3.2	16 7	27.4
Portland, Oregon	52.5	43.3	9.2	56 3	52.0
Sandusky, Ohio*					
Sandy Hook, New Jersey	39.1	32.9	6.2	1 8	30.5
San Francisco, California	50.9	54.8	2.1	36 6	56.6
Savannah, Georgia	57.3	49.0	8.3	9 1	54.3
Smithville, North Carolina	57.2	43.6	13.6	11 0	45.8
Toledo, Ohio*					
Wilmington, North Carolina	51.3	43.8	7.5	14 5	49.3

* No observations made on account of ice. † Record for 29 days. ‡ Record for 23 days.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for March, 1885, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 85.87 per cent. The percentages for the four elements are: Weather, 90.00; direction of the wind, 81.68; temperature, 83.28; barometer, 90.09 per cent. By geographical districts, they are: For New England, 86.24; middle Atlantic states, 88.78; south Atlantic states, 88.50; eastern Gulf states, 87.34; western Gulf states, 86.73; lower lake region, 86.83; upper lake region, 83.98; Ohio valley and Tennessee, 86.05; upper Mississippi valley, 83.97; Missouri valley, 78.46; north Pacific coast region, 80.36; middle Pacific coast region, 97.32; south Pacific coast region, 99.11. There were sixteen omissions to predict out of 6,384, or 0.47 per cent. Of the 3,369 predictions that have been made, forty-seven, or 1.40 per cent., are considered to have entirely failed; one hundred and twenty-four, or 3.68 per cent., were one-fourth verified; three hundred and sixty-four, or 10.80 per cent., were one-half verified; six hundred and sixteen, or 18.28 per cent., were three-fourths verified; 2,218, or 65.84 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During March, 1885, two hundred and sixty-eight cautionary signals were ordered. Of these, two hundred and thirty-four, or 87.31 per cent., were justified by winds of twenty-five miles or more per hour at or within one hundred miles of the station. One hundred and fifty-six cautionary off-shore signals were ordered, of which number one hundred and twenty-two, or 78.21 per cent., were fully justified both as to direction and velocity; one hundred and forty-seven, or 94.22 per cent., were justified as to direction; and one hundred and twenty-eight, or 82.05 per cent., were justified as to velocity. Four hundred and twenty-four signals of all kinds were ordered, three hundred and fifty-six, or 83.96 per cent., being fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Of the above cautionary off-shore signals, one hundred and fifteen were changed from cautionary signals. In forty cases winds of twenty-five miles or more per hour were reported for which no signals were ordered.

COLD-WAVE SIGNALS.

During March, 1885, there were eighty cold-wave signals ordered, of which number, seventy, or 87.5 per cent., were justified.

RAILWAY WEATHER SIGNALS.

The following is from the report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr.:

The predictions for the month of March, telegraphed by General Hazen, the Chief Signal Officer, were as follows:

Local rains.—4th, 12th, 13th, 15th, 21st, 22d, 25th, 26th, 27th, 28th.

Fair weather.—1st, 2d, 3d, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 14th, 16th, 17th, 18th, 19th, 20th, 23d, 24th, 29th, 30th, 31st.

Lower temperature.—13th, 17th, 20th, 22d, 28th, 29th.

Higher temperature.—3d. 4th, 6th, 10th, 11th, 12th, 14th, 15th, 16th, 18th, 19th, 21st, 23d, 24th, 27th, 30th, 31st.

Stationary temperature.—1st, 2d, 5th, 7th, 8th, 9th, 25th, 26th.

Cold-wave signals ordered on the 28th.

A careful examination of all reports shows the verification of predictions to be 92 per cent. for temperature and 93 per cent. for weather.

ATMOSPHERIC ELECTRICITY.

AURORAS.

An extended display of the aurora occurred during the night of the 15–16th Except at stations in Montana, where cloudiness prevailed, this display was observed throughout the northern part of the United States. To the eastward of the Missouri valley stations reporting it are very numerous, Nashville, Tennessee, being the southernmost point at which it was observed. In the northern plateau and north Pacific coast region this display was also reported by numerous observers.

The following reports have been received:

Spokane Falls, Washington Territory, 15th: a bright aurora appeared at 11.10 p. m.; there were three streamers of light pink color, which rose and fell at short intervals; the streamers were not vertical but were inclined towards the west.

Port Angeles, Washington Territory, 15th: an aurora was observed at 1.45 a. m., also at the 7 a. m. and at the 11 p. m. observations, with indications of its having continued uninterruptedly from the time of the first observation. When first seen no dark segment was observed, the horizon being obscured by groups of cirrus cloud, but an arch of light extended over about 150° of the northern horizon, with an elevation of about 40°; above the arch there appeared innumerable "merry dancers," which shot up to an elevation of about 70°. The maximum degree of brilliancy during the display was attained about 2.30 a. m. At the 7 a. m. observation the aurora was observed in the form of an arch of light, which flashed up in broad patches; at 11 p. m. the aurora was again observed, but was soon obscured by fog.

Lewiston, Idaho, 15th: an aurora was observed from 8.20 to 9.30 p. m.; it extended from 45° east of north to 15° west of

Table of miscellaneous meteorological data for March, 1885—Signal Service observations.

Stations.	Elevation above sea-level.	Atmospheric pressure.								Temperature of the air (in degrees Fahrenheit).														Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds.				No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly range of barometer.	Monthly mean.	Departure from normal.	Extremes.						Daily ranges.											Total movement.	Prevailing direction.	Max. velocity.					
					Highest barometer	Date.	Lowest barometer	Date.				Max.	Date.	Mean max	Min.	Date.	Mean min	Monthly range.	Greatest.	Date.	Least.	Date.								Miles p.hr	Direction.	Date.				
New England.																																		
Eastport	61	29.84	+.03	29.91	30.55	30	29.22	19	1.33	22.8	—5.9	48.3	28	28.5	— 5.2	13	15.9	53.5	23.2	13	6.3	8	72.2	15.2	5.94	+0.65	7,759	nw.	43	se.	16	15	8	19	4
Portland	45	29.90	+.05	29.95	30.51	30	29.32	2	1.18	27.4	—5.4	51.9	28	38.3	1.1	13	19.7	50.8	30.8	15	8.6	4	63.8	16.4	1.59	—1.78	5,949	n.	26	w.	21	11	5	20	6
Mount Washington	6,279	23.30	.....	29.82	30.34	30	29.04	20	1.30	2.1	—9.0	28.2	27	14.4	—17.8	21	—8.6	76.0	25.9	22	10.8	29	91.0	0.0	0.95	—5.80	26,045	nw.	*	nw.	21	13	1	12	18
Thatcher's Island	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston	122	29.84	+.05	29.97	30.49	30	29.40	2	1.10	27.9	—6.5	58.9	31	36.7	2.9	13	18.6	56.0	28.8	31	10.6	7	63.6	16.8	1.15	—3.81	10,277	w.	39	w.	10	9	7	16	8
Point Judith	.....	.....	.....	.....	.....	.....	.....	.....	.....	28.7	.....	53.0	28	36.5	5.0	18	20.9	48.0	.....	.....	.....	.....	.....	.....	0.92	.....	.....	.....	.....	.....	8	.....	.....	.....
Block Island	27	29.98	+.09	30.00	30.51	30	29.49	2	1.03	29.8	—6.1	53.1	31	37.1	8.6	18	23.0	44.5	24.3	9	5.6	7	78.5	24.0	0.81	—4.03	10,988	nw.	45	nw.	20	11	7	20	4
Narragansett Pier	.....	.....	.....	.....	.....	.....	.....	.....	.....	28.9	.....	59.0	28	38.3	5.0	18	19.5	54.0	.....	.....	.....	.....	.....	.....	1.02	.....	.....	.....	.....	.....	13	.....	.....	.....
New London	47	29.99	.....	30.03	30.52	30	29.51	2	1.01	29.7	—5.5	53.0	28	36.9	6.0	18	21.5	47.0	20.2	9	8.0	7	69.1	20.4	1.55	—3.51	6,337	nw.	28	nw.	20	9	5	15	11
New Haven	107	29.91	.....	30.02	30.49	30	29.50	2	0.98	26.9	—8.7	53.2	31	36.0	0.2	13	18.4	53.4	30.7	13	10.2	29	72.7	19.0	1.19	—4.01	5,760	n.	28	nw.	20	9	4	17	10
Middle Atlantic states.																																		
Albany	75	29.95	+.07	30.04	30.46	30	29.53	2	0.93	23.1	—9.8	49.0	31	32.4	— 5.5	13	15.0	54.5	29.7	24	9.1	27	66.8	13.3	6.62	—3.32	6,000	nw.	32	s.	9	10	7	14	10
New York City	164	29.87	+.07	30.04	30.48	30	29.51	2	0.94	29.7	—8.7	58.2	31	37.9	0.5	21	22.5	51.7	24.9	12	3.4	7	73.4	22.0	1.19	—3.90	8,886	nw.	48	nw.	10	10	7	16	8
Sandy Hook	26	30.03	+.09	30.05	30.51	30	29.57	1	0.94	30.5	—7.1	56.8	31	37.7	7.4	21	23.2	49.4	21.6	9	5.9	7	70.2	21.8	0.67	—4.72	13,508	nw.	53	nw.	10	7	7	19	5
Barnegat City	22	30.03	+.08	30.04	30.49	30	29.58	1	0.91	32.3	—5.8	54.9	4	41.3	9.4	21	25.6	45.5	25.7	24	5.6	7	77.7	25.9	0.23	—4.83	11,649	nw.	40	no.	29	5	5	20	8
Little Egg Harbor	.....	.....	.....	.....	.....	.....	.....	.....	.....	30.8	.....	52.5	4	38.0	5.4	21	23.7	47.1	.....	.....	.....	.....	.....	.....	1.10	.....	.....	.....	.....	.....	12	.....	.....	.....
Atlantic City	13	30.03	+.08	30.03	30.46	30	29.60	1	0.86	31.4	—7.1	55.3	4	38.7	8.5	21	24.8	46.8	26.1	9	5.5	7	82.7	20.6	0.95	—3.18	7,400	nw.	31	n.	29	9	6	19	6
Cape May	27	30.02	.....	30.04	30.46	30	29.60	1	0.85	34.3	—6.0	52.3	27	38.7	10.8	21	28.0	41.5	21.3	9	5.6	2	79.7	28.5	2.29	—2.89	12,476	nw.	54	nw.	20	15	7	20	4
Philadelphia	117	29.93	+.06	30.05	30.48	30	29.59	2	0.89	30.8	—9.1	61.5	31	38.6	6.5	21	23.1	55.0	24.5	31	8.8	7	66.0	20.5	0.69	—2.69	8,115	nw.	24	nw.	20	7	7	18	6
Baltimore	45	30.02	+.06	30.06	30.46	30	29.62	1	0.84	35.3	—6.8	68.4	31	42.6	11.8	21	28.4	56.6	28.5	31	7.4	12	57.7	21.2	1.60	—2.51	4,870	nw.	22	nw.	20	12	8	18	5
Washington City	106	29.97	+.06	30.07	30.48	24	29.63	15	0.86	34.5	—7.7	70.1	31	43.1	10.3	21	26.6	59.8	30.3	31	7.6	2	67.0	24.0	1.53	—2.74	5,589	s.	24	nw.	20	9	5	19	7
Delaware Breakwater	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ocean City	.....	.....	.....	.....	.....	.....	.....	.....	.....	34.7	.....	52.2	28	41.8	10.8	20	27.6	42.4	.....	.....	.....	.....	.....	.....	2.37	.....	.....	.....	.....	.....	3	.....	.....	.....
Chincoteague	8	30.05	+.08	30.04	30.48	24	29.61	1	0.87	35.7	—5.7	60.0	4	42.5	10.6	24	27.1	49.4	30.5	4	6.0	17	78.9	29.4	2.25	—2.18	8,988	nw.	40	nw.	20	11	13	13	5
Cape Henry	16	30.06	+.05	30.06	30.51	24	29.60	15	0.91	39.4	—7.9	67.9	31	49.0	20.6	21	32.6	47.3	22.7	10	6.5	23	72.7	30.7	2.51	—3.68	10,287	n.	40	no.	22	14	11	10	10
Norfolk	30	30.06	+.08	30.07	30.49	24	29.64	15	0.85	40.8	—6.9	68.9	31	49.5	20.0	24	33.5	48.9	26.0	31	5.1	13	71.9	31.9	3.04	—1.65	6,589	n.	26	ne.	22	14	10	14	7
Lynchburg	652	29.35	+.04	30.05	30.46	24	29.63	15	0.84	39.0	—7.2	70.7	31	48.4	17.4	24	30.9	53.3	33.4	31	6.5	20	64.8	27.1	1.18	—2.87	3,470	sw.	22	nw.	19	11	7	12	12
South Atlantic states.																																		
Kitty Hawk	22	30.07	+.05	30.06	30.53	24	29.56	19	0.97	41.7	—6.4	67.9	31	49.9	22.5	20	35.1	45.4	26.7	15	2.8	18	76.7	34.5	3.48	—2.83	12,843	ne.	52	ne.	22	15	10	12	9
Hatteras	12	30.06	+.07	30.05	30.53	25	29.64	19	0.89	44.4	—6.4	60.5	28	51.8	26.0	19	37.6	40.5	25.1	15	5.1	6	80.8	38.4	3.72	—4.12	9,919	ne.	42	ne.	22	17	5	16	10
Fort Macon	11	30.08	+.07	30.06	30.54	24	29.64	19	0.90	45.3	—6.1	64.2	31	52.3	24.2	23	37.8	40.0	21.9	2	3.5	18	80.7	39.5	2.59	—3.49	11,662	sw.	60	sw.	29	12	8	11	12
New River Inlet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington	52	30.04	+.06	30.06	30.53	24	29.66	19	0.87	49.3	—5.2	71.2	10	58.8	26.2	24	40.0	45.0	30.4	10	9.2	28	64.6	36.6	2.05	—2.41	5,375	sw.	27	sw.	1	14	11	10	10
Smithville	34	30.06	+.04	30.05	30.53	24	29.65	19	0.88	45.8	—8.5	64.7	31	53.1	22.3	24	37.6	42.4	25.3	19	5.5	11	77.0	38.7	2.18	—1.98	7,172	sw.	31	s.	28	10	7	14	10
Charlotte	868	29.23	+.06	30.08	30.51	24	29.69	15	0.82	45.3	—5.8	69.0	31	55.3	24.0	21	30.6	45.0	31.0	10	7.0	28	65.3	33.4	2.91	—2.73	4,435	sw.	26	w.	6	12	7	13	11
Atlanta	1,129	28.92	+.05	30.10	30.48	24	29.80	19	0.62	47.0	—6.8	69.5	31	56.2	30.4	23	38.1	49.1	27.6	17	9.0	4	56.0	30.4	4.26	—2.90	7,494	sw.	32	sw.	7	10	7	13	11
Augusta	183	29.94	+.05	30.10	30.54	24	29.75	15	0.79	49.5	—7.1	75.8	31	62.4	26.4	24	39.6	49.4	32.1	10	10.1	28	67.2	30.7	1.85	—3.89	3,139	w.	18	w.	7	10	8	12	11
Charleston	52	30.04	+.04	30.06	30.53	24	29.71	19	0.82	52.2	—5.4	71.6	27	59.9	33.5	24	44.6	38.1	24.9	10	8.2	26	73.1	43.2	1.70	—2.70	5,227	sw.	24	ne.	22	10	10	9	12
Savannah	87	30.03	+.06	30.09	30.52	24	29.76	19	0.76	54.3	—5.4	77.0	28	62.6	33.3	9	45.3	43.7	25.8	12	8.0	26	63.9	41.0	3.11	—1.01	5,472	nw.	24	nw.	18	10	7	11	13
Jacksonville	43	30.08	+.04	30.09	30.45	21	29.74	22	0.70	57.6	—3.5	78.9	28	66.3	37.8	9	50.1	41.1	25.6	10	5.9	5	73.8	48.3	5.66	+2.57	4,039	ne.	24	sw.	28	11	8	13	10
Cape Lookout	.....	.....	.....	.....	.....	.....	.....	.....	.....	45.9	.....	66.9	28	55.0	21.0	19	36.8	45.9	.....	.....	.....	.....	.....	.....	2.87	.....	.....	.....	.....	.....	9	.....	.....	.....
Portsmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	45.6	.....	67.2	31	53.2	25.0	23	38.0	42.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Florida peninsula.																																		
Sanford	90	30.11	.....	30.14	30.45	24	29.85	22	0.60	61.9	.....	88.3	28	73.4	43.5	9	53.1	44.8	34.8	21	6.4	16	71.0	51.1	4.60	.....	4,498	n.	23	nw.	2	10	9	8	14
Cedar Keys	23	30.10	+.02	30.08	30.39	9	29.78	21	0.61	58.7	—5.8	75.9	31	65.0	39.4	9	53.1	36.5	19.5	10	5.9	22	74.8	50.2	3.07	—0.24	5,748	w.	37	s.	21	10	5	13	13
Key West	20	30.10	+.02	30.07	30.30	9	29.88	16	0.42	70.8	—2.7	85.0	29	76.4	60.9	9	66.7	24.1	15.9	21	3.5	8	78.6	63.6	1.19	+0.56	7,875	n.	31	nw.	2	7	1	10	14
Eastern Gulf states.																																		
Montgomery	219	29.91	+.07	30.11	30.51	9	29.77	21	0.74	51.7	—6.3	75.9	28	62.2	26.2	23	40.5	49.7	32.9	17	9.0	21	67.5	39.5	2.93	—3.84	4,117	nw.	23	e.	7	12	7	9	15
Pensacola	30	30.12	+.07	30.11	30.49	9	29.75	21	0.74	54.8	—7.0	77.4	13	63.0	31.2	23	47.3	46.2	23.4	23	4.8	15	72.4	45.0	4.54	+0.17	5,107	n.	24	w.	29	10	0	12	15
Mobile	35	30.12	+.09	30.12	30.51	9	29.74	21	0.77	53.5	—6.3	78.2	27	63.2	29.0	23	44.3	49.2	29.9	7	6.5	4	71.8	43.0	6.36	—1.40	4,193	nw.	26	w.	29	10	9	12	10
Vicksburg	244	29.91	+.11	30.14	30.56	9	29.76	21	0.80	54.4	—4.4	77.2	31	64.9	27.0	23	44.5	50.2	34.4	18	7.1	21	56.9	37.8	2.02	—4.92	4,135	s.	25	n.	8	7	7	14	10
New Orleans	52	30.09	+.09	30.11	30.51	9	29.72	21	0.78	58.4	—4.7	77.2	28	65.6	36.0	23	51.1	41.2	19.5	23	6.3	15	68.0	40.9	6.99	+1.06	5,155	n.	20	sw.	12	9	8	13	10
Western Gulf states.																																		
Fort Smith	470	29.64	+.11	30.13	30.50	23	29.80	12	0.69	47.9	—3.2	79.8	31	59.9	24.3	18	37.1	55.5	37.8	2	9.5	26	69.0	36.7	1.68	—0.92	4,419	e.	24	nw.	1	8	9	10	12
Little Rock	298	29.82	+.09	30.11	30.51	23	29.78	12	0.72	51.1	—3.0	77.0	31	62.7	27.1	18	40.8	49.9	30.4	18	9.0	25	71.1	41.1	3.84	—1.19	4,873	s.	30	n.	28	11	10	13	8
Shreveport	237	29.92	+.10	30.13	30.52	23	29.76	21	0.70	54.4	—4.6	81.5	12	66.1	31.0	23	45.2	50.5	33.4	30	9.0	5	69.5	43.6	1.79	—3.23	4,653	s.	23	nw.	8	8	7	13	11
Palestine	533	29.61	+.10	30.15	30.48	9	29.75	21	0.74	54.0	—4.9	78.0	12	65.1	31.1	23	45.4	47.5	29.8	21	4.9	24	65.5	41.7	2.25	—0.89	7,293	s.	25	nw.	21	11	11	11	9
Indianola	20	30.12	+.11	30.10	30.46	9	29.78	21	0.68	60.5	—4.7	79.9	21	67.0	39.8	22	54.8	40.1	27.7	21	5.0	31	83.8	55.2	1.95	—0.65	10,250	e.	44	n.	1	13	10	14	7
Galveston	40	30.12	+.12	30.12	30.48	9	29.72	21	0.70	60.7	—3.1	73.5	13	67.1	43.2	23	54.7	30.3	19.1	18	7.5	15	79.2	53.7	3.17	+0.03	7,518	se.	32	n.	15	12	9	17	5
San Antonio	.....	29.31	.....	.....	.....	.....	.....	.....	.....	0.57	59.2	—5.3	81.8	13	68.8	35.7	22	49.9	46.1	32.0	21	6.5	14	73.5	49.8	3.87	+2.21	4,876	ne.	30	n.	21	9	8	12	5
Rio Grande valley.																																		
Rio Grande City	230	29.91	+.09	30.06	30.35	8	29.77	21	0.58	66.9	—4.0	91.9	22	75.7	49.0	22	60.0	42.9	28.8	30	2.0	20	74.4	57.5	0.41	—0.71	4,464	se.	20	nw.	11	7	18	10	3
Brownsville	57	30.05	+.07	30.06	30.34	9	29.78	21	0.57	65.9	—3.1	84.0	28	74.0	47.8	22	60.5	36.2	19.8	23	4.0	6	87.1	61.0	1.54	+0.32	5,976	n.	28	s.	11	13	18	12	1
Tennessee.																																		
Nashville	549	29.53	+.08	30.11	30.51	23	29.80	14	0.71	41.8	—7.7	74.2	31	53.2	16.6	23	31.4	57.6	33.9	11	8.7	12	69.7	31.8	2.33	—3.13	4,991	nw.	29	nw.	28	10	8	17	6
Memphis	321	29.80	+.10	30.12	30.53	23	29.82	12	0.72	47.9	—4.0	74.3	31	56.8	26.2	22	39.9	48.1	24.8	29	6.9	13	61.9	33.9	3.07	—3.10	5,603	nw.	38	nw.	28	13	8	13	10
Chattanooga	753	29.29	+.06	30.11	30.49	24	29.77	28	0.72	45.6	—6.4	71.6	31	55.2	19.6	23	30.2	52.0	29.5	3	8.5	13	66.0	34.0	1.79	—5.20	4,931	nw.	22	nw.	28	8	6	12	13
Knoxville	980	29.06	+.05	30.10	30.40	24	29.77	28	0.69	42.2	—5.6	70.5	31	53.1	17.3	23	32.1	53.2	30.0	3	8.8	12	67.5	31.2	3.10	—2.83	4,173	w.	21	w	30	9	9	11	11
Ohio valley.																																		
Pittsburg	766	29.21	+.04	30.05	30.40	11	29.57	15	0.83	31.0	—7.2	61.2	31	39.6	4.9	17	22.4	56.3	27.2	9	7.0	12	69.1	21.3	1.14	—1.95	5,269	nw.	25	s.	30	20	13	15	3
Columbus	805	29.20	+.07	30.09	30.42	23	29.03	14	0.79	29.6	—10.0	63.6	31	38.3	1.4	20	21.9	62.2	29.4	31	5.0	2	75.4	22.5	0.53	—3.09	0,864	w.	33	sw.	9	13	13	10	8
Indianapolis	753	29.26	+.09	30.10	30.45	23	29.61	14	0.83	30.0	—10.0	63.8	31	40.7	3.2	20	25.0	60.0	22.0	20	7.0	4	70.0	24.0	0.82	—3.32	4,990	sw.	20	nw.	15	11	10	17	4
Greencastle	.....	29.13	.....	.....	30.45	23	29.59	14	0.80	32.8	.....	62.9	31	41.9	2.4	20	24.7	60.5	33.9	9	8.4	29	73.7	24.9	0.66	.....	7,091	sw.	30	nw.	9	13	11	13	7
Cincinnati	628	29.43	+.06	30.10	30.48	23	29.04	14	0.84	33.2	—10.1	71.2	31	42.6	6.2	20	29.6	65.0	32.5	31	8.3	8	71.4	24.2	0.56	—3.30	5,793	sw.	38	w.	30	12	9	18	4
Louisville	530	29.52	+.10	30.10	30.48	23	29.69	14	0.79	39.6	—5.2	75.0	31	47.9	12.3	20	31.4	62.7	31.7	31	4.1	7	69.2	29.6	1.02	—3.35	0,198	sw.	30	nw.	19	9	9	17	5
Lower lake region.																																		
Detroit	661	29.32	+.04	30.06	30.42	10	29.42	14	1.00	26.2	—6.9	54.9	26	34.5	— 3.0	20	18.1	56.9	30.2	11	7.4	5	71.6	18.3	0.66	—2.16	7,891	s.	32	sw.	9	10	9	16	6
Toledo	651	29.35	+.07	30.07	30.44	10	29.48	14	0.96	28.1	—8.7	56.5	26	35.7	— 2.3	20	19.7	58.8	25.3	9	5.4	7	71.4	19.9	0.63	—1.63	7,165	w.	40	sw.	9	11	8	15	8
Sandusky	639	29.37	+.06	30.08	30.44	10	29.51	14	0.92	27.0	—9.7	54.5	31	34.6	— 3.4	20	19.3	57.9	24.3	9	5.0	29	70.9	18.7	0.75	—2.20	10,732	nw.	47	nw.	15	7	10	14	7
Cleveland	690	29.30	+.05	30.07	30.42	10	29.51	14	0.91	24.4	—9.8	55.5	31	32.8	— 4.4	21	10.8	59.9	29.5	9	6.6	5	81.7	19.5	0.87	—2.20	7,318	w.	34	sw.	9	10	10	15	6
Erie	681	29.30	+.06	30.06	30.44	10	29.48	14	0.97	25.0	—8.6	53.5	31	33.2	— 0.6	21	16.7	54.1	25.4	9	5.1	7	72.6	17.3	1.83	—1.30	7,836	nw.	35	w.	15	18	11	15	5
Buffalo	690	29.26	+.04	30.04	30.44	11	29.42	15	1.03	19.7	—11.0	45.1	30	28.1	— 4.1	13	12.7	49.2	27.2	9	4.0	7	81.6	15.1	1.53	—1.36	10,110	sw.	50	sw.	9	19	12	15	4
Rochester	621	29.33	+.03	30.03	30.43	11	29.45	15	0.98	20.6	—11.0	53.0	27	29.1	— 6.7	13	13.0	59.7	30.2	9	6.3	8	80.1	14.7	0.96	—2.44	9,914	w.	52	sw.	15	21	15	15	1
Oswego	334	29.64	+.04	30.02	30.45	11	29.54	15	0.91	18.7	—13.5	49.0	27	25.9	— 9.0	13	11.7	58.0	28.2	9	6.6	17	78.6	12.9	0.48	—2.76	9,095	w.	38	sw.	15	13	11	20	0
Upper lake region.																																		
Duluth	644	29.31	+.03	30.10	30.50	10	29.48	2	1.03	17.6	—7.3	47.0	31	26.8	—16.9	30	7.8	63.9	32.9	20	5.9	3	74.8	10.9	0.77	—0.88	5,319	nw.	30	n.	1	12	10	13	8
Marquette	673	29.29	+.02	30.07	30.50	10	29.32	14	1.18	12.0	—12.1	49.2	31	22.2	—15.3	16	2.2	64.5	36.5	29	8.5	2	81.5	7.3	2.14	+0.80	5,012	nw.	34	nw.	9	16	7	13	11
Escanaba	612	29.33	.00	30.04	30.45	10	29.25	14	1.20	14.0	—8.6	48.2	31	25.3	—14.7	31	0.7	72.9	41.7	23	12.1	16	68.7	5.4	2.23	+0.52	6,951	n.	35	nw.	9	15	8	15	7
Milwaukee	647	29.28	+.03	30.06	30.45	10	29.39	14	1.06	24.5	—6.3	43.6	26	32.1	— 4.3	20	17.2	57.9	25.7	8	4.4	6	77.3	15.1	1.40	—1.42	8,696	nw.	45	nw.	14	8	8	17	0
Chicago	661	29.34	+.06	30.07	30.42	10	29.48	14	0.93	30.6	—5.2	57.9	26	38.9	4.4	20	23.7	53.5	29.0	10	7.4	3	75.2	23.0	0.57	—2.40	5,493	sw.	28	sw.	9	8	8	17	0
Grand Haven	620	29.35	+.03	30.05	30.42	10	29.38	14	1.05	23.4	—8.3	45.4	26	32.7	— 4.9	21	10.0	50.3	27.6	17	7.2	31	77.5	17.4	1.02	—1.59	7,983	sw.	49	nw.	15	13	10	10	5
Mackinaw City	605	29.35	+.01	30.05	30.48	10	29.25	14	1.23	12.0	—8.2	41.0	31	22.4	—21.3	20	—2.1	62.3	44.0	23	11.7	10	77.0	6.0	1.21	—0.15	7

Table of miscellaneous meteorological data for March, 1885—Signal Service observations—Continued.

Stations.	Elevation above sea-level.	Atmospheric pressure.								Temperature of the air (in degrees Fahrenheit).																Mean rel. humidity.	Mean dew-point.	Precipitation.	Departure from normal	Winds.				No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
		Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes.				Monthly range of barometer.	Monthly mean.	Departure from normal.	Extremes.						Monthly range.	Daily ranges.											Total movement.	Prevailing direction.	Max. velocity.					
					Highest barometer	Date.	Lowest barometer	Date.				Max.	Date.	Mean max	Min.	Date.	Mean min		Greatest.	Date.	Least.	Date.									Miles p.hr	Direction.	Date.				
Extreme northwest.																																			
Fort Buford	1,930	28.02	—.01	30.19	30.58	22	29.80	29	0.78	28.7	+ 5.9	58.0	25	39.1	2.7	16	19.9	55.3	35.2	1	9.7	21	77.1	22.2	0.03	—0.49	8,092	w.	58	w.	2	3	12	19	0
Bismarck	1,694	28.24	+.05	30.16	30.58	22	29.71	29	0.87	25.7	+ 3.9	49.0	31	35.2	— 9.0	16	16.9	58.0	33.9	17	7.2	21	83.3	21.2	0.18	—0.97	6,515	nw.	48	nw.	2	5	8	18	5
Fort Yates	.....	.....	.....	.....	.....	...	.....	...	.....	30.6	.....	63.5	8	45.2	— 4.5	6	16.0	68.0	.....	...	.....	...	.....	.....	0.44	.....	.....	.....	...	.....	...	13	...	...	...
Fort Totten	.....	.....	.....	.....	.....	...	.....	...	.....	.....	.....	.....	...	.....	.....	...	.....	.....	.....	...	.....	...	.....	.....	.....	.....	.....	.....	...	.....	...	...	...	...	...
Moorhead	923	29.06	+.02	30.14	30.58	22	29.43	2	1.14	22.5	+ 4.3	48.6	2	33.0	—15.5	16	12.3	64.1	39.0	9	8.7	5	69.5	14.0	0.31	—1.25	8,764	n.	41	n.	14	...	7	17	7
Saint Vincent	804	29.23	+.04	30.19	30.07	16	29.38	2	1.29	15.1	+ 1.4	42.3	2	25.9	—25.4	16	2.8	67.7	39.2	9	9.0	11	79.5	9.9	0.46	—0.51	7,679	nw.	42	n.	14	11	7	18	6
Upper Mississippi valley.																																			
Saint Paul	801	29.16	+.03	30.07	30.46	22	29.44	3	1.02	27.0	+ 0.2	54.7	31	38.5	— 5.8	16	18.3	60.5	35.4	23	9.9	1	70.0	18.1	0.55	—1.07	5,642	nw.	33	nw.	14	7	3	20	8
La Crosse	725	29.25	+.01	30.05	30.43	10	29.46	3	0.97	28.0	— 3.8	53.0	26	36.4	— 2.0	17	20.7	55.0	31.7	23	7.1	20	71.3	19.8	0.51	—1.29	6,703	w.	42	nw.	14	8	5	15	11
Dubuque	665	29.34	.....	30.07	30.44	17	29.54	14	0.90	30.3	— 3.2	60.3	26	39.0	— 1.1	21	22.1	61.4	32.2	25	6.8	3	62.1	18.5	0.41	—2.03	4,418	nw.	26	w.	14	6	7	15	9
Davenport	615	29.42	+.07	30.10	30.44	17	29.63	14	0.81	34.3	— 1.2	59.7	31	42.3	7.6	17	26.0	52.1	34.3	23	7.0	3	68.2	24.7	0.17	—2.19	7,750	nw.	34	w.	14	4	7	17	7
Des Moines	849	29.19	+.00	30.13	30.46	16	29.72	14	0.74	33.8	— 1.4	63.4	16	43.5	7.0	17	25.5	56.4	34.9	25	5.5	1	68.8	24.4	0.04	—1.50	5,776	n.	29	nw.	14	1	8	13	10
Keokuk	618	29.43	+.08	30.11	30.45	17	29.70	14	0.74	34.7	— 3.4	60.4	31	43.5	8.6	17	26.9	51.8	27.8	25	5.5	7	69.9	25.4	0.17	—2.21	7,359	nw.	28	nw.	14	4	2	18	11
Springfield	644	29.42	+.06	30.10	30.46	23	29.64	14	0.81	36.8	— 3.0	65.5	31	45.8	12.0	22	29.1	53.5	20.5	9	5.8	7	61.1	24.4	0.17	—3.19	7,493	nw.	29	w.	14	5	5	19	7
Saint Louis	583	29.51	+.09	30.13	30.50	23	29.74	14	0.76	41.1	— 1.0	74.0	31	50.4	13.1	22	32.5	60.9	31.4	9	0.5	7	64.2	29.2	0.40	—2.64	9,878	nw.	42	w.	14	5	5	13	13
Cairo	377	29.70	+.07	30.13	30.53	23	29.76	14	0.77	42.5	— 4.9	75.1	31	51.3	16.5	22	31.9	58.6	29.4	31	5.0	8	64.5	31.0	1.08	—3.11	7,306	s.	34	nw.	28	7	4	18	9
Missouri valley.																																			
Fort Bennett	1,510	28.51	.....	30.21	30.60	16	29.88	29	0.72	32.7	+ 7.9	62.9	8	46.6	4.2	17	22.9	58.7	44.1	25	9.8	6	68.3	22.5	0.13	—1.10	6,451	n.	48	nw.	14	3	5	21	5
Fort Sully	.....	.....	.....	.....	.....	...	.....	...	.....	36.3	.....	67.0	13	49.2	2.7	17	23.4	69.7	.....	...	.....	...	.....	.....	0.06	.....	.....	.....	...	.....	...	7	...	...	...
Yankton	1,228	28.79	+.06	30.17	30.52	16	29.79	20	0.73	33.2	+ 3.2	65.7	30	45.2	2.4	10	23.8	63.3	39.8	17	9.1	6	69.4	23.7	0.25	—0.95	6,109	n.	33	n.	14	2	2	21	8
Huron	1,305	28.68	+.04	30.16	30.56	16	29.74	29	0.81	30.0	+ 2.3	63.5	13	42	3 — 3.1	16	20.3	66.6	39.5	17	7.9	6	66.7	20.1	0.12	—0.80	7,331	nw.	37	nw.	2	5	7	17	7
Omaha	1,113	28.94	+.07	30.16	30.50	17	29.79	20	0.71	36.1	+ 0.7	60.3	9	46	9.1	17	27.4	57.2	38.2	30	7.5	6	68.6	26.1	0.33	—1.25	8,027	n.	38	nw.	14	6	3	10	12
Leavenworth	842	29.22	+.08	30.14	30.49	17	29.70	20	0.79	40.0	— 1.0	70.0	31	51.1	15.0	17	30.5	55.0	37.5	20	7.0	19	70.8	30.5	0.31	—2.18	3,973	nw.	17	s.	20	7	4	15	12
Lamar	.....	29.06	.....	.....	.....	...	.....	...	.....	0.07	40.8	78.0	31	52.6	16.3	17	31.4	61.7	30.0	20	9.0	12	68.2	29.9	1.27	.....	8,279	sw.	33	s.	10	7	6	18	7
Northern slope.																																			
Fort Assiniboine	2,710	27.22	+.04	30.25	30.54	24	29.95	31	0.60	39.6	+11.0	68.2	19	52.8	15.0	17	29.8	53.2	44.2	17	10.1	4	70.9	30.3	0.13	—0.64	8,837	sw.	42	nw.	13	6	6	15	10
Fort Benton	2,700	27.30	+.11	30.28	30.52	16	29.99	31	0.53	41.7	+11.7	71.3	19	56.3	17.5	24	30.8	53.8	40.3	19	9.0	23	57.7	26.5	0.40	—0.81	5,748	sw.	38	sw.	2	7	0	9	16
Fort Shaw	3,550	26.41	.....	30.22	30.46	22	29.99	31	0.47	40.2	+ 7.9	68.5	31	53.8	8.7	24	27.9	59.8	45.5	19	13.3	23	69.3	30.8	0.35	—0.21	7,487	sw.	53	w.	15	7	4	11	16
Helena	4,044	25.91	.....	30.23	30.44	17	30.06	11	0.38	40.6	+ 7.2	62.5	31	50.9	19.5	18	32.4	43.0	34.5	18	9.7	6	60.6	27.3	0.28	—0.13	5,131	sw.	29	n.	29	6	5	14	12
Fort Custer	3,040	26.92	+.14	30.25	30.51	10	30.02	15	0.49	39.6	+ 7.9	68.0	31	52.5	6.5	17	26.2	61.5	44.0	17	12.4	2	67.7	28.5	0.24	—0.29	9,385	w.	49	w.	2	4	9	14	8
Fort Maginnis	4,340	25.61	.....	30.21	30.41	18	30.04	15	0.38	36.2	.....	61.6	19	47.5	14.5	22	26.6	47.1	33.0	19	12.2	4	43.5	15.6	0.70	.....	10,342	w.	48	w.	13	13	0	14	11
Deadwood	4,600	25.40	+.12	30.24	30.44	12	30.02	29	0.42	33.1	+ 1.5	55.0	9	41.6	7.0	17	25.8	48.0	25.0	13	4.5	21	71.0	24.1	3.31	+1.53	2,331	ne.	16	ne.	13	12	3	17	11
Cheyenne	6,089	24.04	+.13	30.23	30.44	8	30.01	16	0.43	33.7	+ 0.0	61.3	31	44.7	3.1	23	23.4	58.2	34.9	25	8.5	6	65.3	21.2	0.51	—0.05	8,621	nw.	46	nw.	2	7	0	6	17
North Platte	2,841	28.15	+.10	30.19	30.44	24	29.88	20	0.57	30.0	+ 0.9	69.0	30	49.4	9.6	17	20.6	59.4	41.5	30	7.5	22	69.0	26.8	0.37	—0.37	5,949	w.	32	nw.	14	7	3	13	15
Middle slope.																																			
Denver	5,394	24.79	+.14	30.22	30.43	7	29.96	16	0.47	38.5	— 1.2	68.3	30	52.6	5.4	23	26.1	62.9	39.4	23	9.5	24	57.3	21.6	0.97	+0.10	5,547	s.	36	w.	5	8	3	14	14
Pike's Peak	14,134	17.72	.....	30.30	30.49	8	30.07	4	0.43	9.3	+ 1.5	22.6	31	14.7	—12.0	5	4.1	34.6	10.8	1	7.0	5	80.4	4.1	0.88	—1.10	15,050	w.	72	nw.	6	10	0	12	13
Dodge City	2,517	27.50	+.12	30.19	30.47	17	29.76	20	0.70	40.9	— 1.2	75.0	31	55.9	13.4	17	28.8	61.6	41.4	29	11.8	23	68.3	29.4	0.75	—0.07	1,718	nw.	41	n.	20	5	2	16	13
West Las Animas	3,905	26.08	+.09	30.13	30.41	1	29.75	20	0.66	40.9	0.0	75.3	30	59.9	16.7	17	25.5	58.6	49.1	29	15.0	24	61.0	26.0	0.36	—0.12	5,121	w.	40	n.	27	4	5	13	13
Fort Elliott	2,650	27.32	+.10	30.13	30.39	8	29.78	20	0.61	45.3	— 0.6	82.0	31	59.6	18.0	17	33.7	64.0	41.0	31	11.0	24	66.1	32.4	1.86	+1.60	7,481	nw.	44	n.	21	6	3	14	14
Fort Reno	.....	.....	.....	.....	.....	...	.....	...	.....	49.2	.....	75.6	30	60.3	21.6	22	38.1	54.0	.....	...	.....	...	.....	.....	2.20	.....	.....	.....	...	.....	...	9	...	...	...
Fort Supply	.....	.....	.....	.....	.....	...	.....	...	.....	45.5	.....	79.0	31	57.6	18.0	17	33.4	61.0	.....	...	.....	...	.....	.....	1.48	.....	.....	.....	...	.....	...	6	...	...	...
Southern slope.																																			
Fort Sill	1,200	28.88	+.09	30.14	30.43	8	29.78	11	0.65	48.3	— 5.4	80.0	31	59.0	25.5	17	39.5	54.5	34.0	5	4.5	4	69.9	37.2	1.35	+0.10	9,250	n.	40	n.	17	6	4	13	14
Fort Concho	1,900	28.20	+.11	30.14	30.42	8	29.83	20	0.59	52.2	— 5.9	80.3	27	65.3	29.5	22	42.1	50.8	40.3	29	4.3	25	74.0	43.1	1.74	+0.50	7,002	s.	31	n.	14	8	9	15	7
Fort Stockton	3,010	27.07	+.11	30.12	30.41	1	29.83	20	0.58	54.1	— 3.0	84.0	31	67.9	33.2	22	43.8	50.8	36.0	29	10.7	15	69.4	43.1	7.78	+7.11	5,888	s.	36	se.	13	9	3	15	13
Fort Davis	4,928	25.22	.....	30.06	30.27	8	29.82	20	0.46	51.8	— 2.9	78.0	30	66.0	31.3	2	41.5	46.7	34.5	6	6.5	15	61.1	30.4	1.28	+0.97	5,385	sw.	40	sw.	21	8	0	14	11
Southern plateau.																																			
Fort Verde	.....	.....	.....	.....	.....	...	.....	...	.....	54.0	+ 0.4	78.5	30	70.1	30.5	6	38.3	48.0	.....	...	.....	...	.....	.....	2.25	+1.30	.....	.....	...	.....	...	7	...	...	...
Prescott	5,389	24.77	+.10	30.14	30.37	1	29.93	20	0.44	46.0	+ 2.7	69.5	8	60.7	20.8	6	32.5	48.7	43.7	6	12.4	24	59.9	30.1	1.47	+0.06	3,679	s.	30	s.	11	6	6	11	14
Wickenburg	.....	.....	.....	.....	.....	...	.....	...	.....	60.1	+ 5.4	84.5	30	70.7	33.0	4	43.6	51.5	.....	...	.....	...	.....	.....	0.50	—0.33	.....	.....	...	.....	...	9	...	...	...
Phoenix	.....	.....	.....	.....	.....	...	.....	...	.....	59.9	— 0.6	91.3	31	81.9	28.5	21	37.8	62.8	.....	...	.....	...	.....	.....	0.33	—0.50	.....	.....	...	.....	...	4	...	...	...
Fort Grant	4,856	25.25	.....	30.05	30.23	1	29.90	20	0.33	53.1	+ 1.1	77.2	31	66.4	36.7	1	44.1	40.5	30.6	15	10.9	19	52.9	34.5	1.40	—0.20	4,951	se.	34	se.	9	7	6	11	14
Fort Thomas	2,710	27.26	.....	30.01	30.25	1	29.84	20	0.41	55.8	+ 2.6	80.2	31	70.6	30.6	6	41.6	49.6	43.0	7	12.3	24	55.5	37.4	0.75	—0.86	.....	w.	...	.....	...	5	4	18	9
Fort Apache	5,050	25.14	+.16	30.14	30.33	1	29.94	20	0.40	47.1	+ 2.4	71.8	31	63.3	22.0	6	33.7	49.8	45.1	6	11.8	20	64.9	34.0	2.05	+0.24	4,086	ne.	27	ne.	1	9	5	12	14
San Carlos	.....	.....	.....	.....	.....	...	.....	...	.....	58.3	.....	82.3	31	72.3	34.4	7	44.4	47.9	.....	...	.....	...	.....	.....	1.28	.....	.....	.....	...	.....	...	6	...	...	...
Fort Bowie	.....	.....	.....	.....	.....	...	.....	...	.....	55.4	.....	82.0	31	67.3	37.0	2	43.5	45.0	.....	...	.....	...	.....	.....	2.19	.....	.....	.....	...	.....	...	11	...	...	...
Maricopa	.....	.....	.....	.....	.....	...	.....	...	.....	63.5	.....	92.1	1	79.1	36.5	4	47.8	55.5	.....	...	.....	...	.....	.....	0.15	.....	.....	.....	...	.....	...	1	...	...	...
Willcox	.....	.....	.....	.....	.....	...	.....	...	.....	55.0	.....	82.0	31	71.9	25.0	15	38.2	57.0	.....	...	.....	...	.....	.....	1.52	.....	.....	.....	...	.....	...	8	...	...	...
El Paso	3,764	26.30	+.06	30.06	30.30	1	29.79	20	0.52	50.6	+ 3.2	83.6	31	72.0	29.2	2	44.5	54.4	39.6	7	16.3	18	43.1	30.3	0.34	—0.22	3,778	w.	29	n.	14	6	0	17	8
Santa Fé	.....	23.30	+.15	30.20	30.38	8	29.92	20	0.46	40.2	+ 0.4	62.0	31	51.4	22.0	4	30.5	40.0	30.0	7	11.0	20	54.4	23.1	1.51	+1.01	5,666	n.	21	nw.	27	9	5	15	11
Lava	.....	.....	.....	.....	.....	...	.....	...	.....	53.0	.....	85.5	31	71.1	21.0	8	35.0	64.5	.....	...	.....	...	.....	.....	1.02	.....	.....	.....	...	.....	...	10	...	...	...
Middle plateau.																																			
Salt Lake City	4,348	25.73	+.12	30.24	30.58	1	29.92	16	0.66	44.9	+ 3.7	70.4	31	54.6	24.3	1	36.5	46.1	26.4	9	11.6	21	58.4	30.3	0.64	—1.44	2,770	nw.	22	nw.	22	2	1	10	20
Fort Bridger	.....	.....	.....	.....	.....	...	.....	...	.....	32.6	.....	59.7	31	44.4	10.5	9	20.7	49.2	.....	...	.....	...	.....	.....	0.27	.....	.....	.....	...	.....	...	7	...	...	...
Winnemucca	.....	25.73	+.10	30.23	30.50	1	29.98	16	0.51	45.0	+ 5.3	70.3	30	60.3	19.2	4	26.4	51.1	42.2	15	14.3	31	44.5	22.1	0.20	—0.68	5,308	ne.	25	sw.	11	2	3	4	24
Montrose	.....	24.75	.....	.....	.....	...	.....	...	0.61	39.3	.....	68.2	31	55.5	16.5	1	27.8	51.7	30.6	31	14.3	21	64.8	26.2	0.67	.....	4,996	e.	36	nw.	27	8	0	7	17
Northern plateau.																																			
Dayton	1,667	28.41	.....	30.23	30.54	2	30.04	31	0.50	48.6	+ 6.2	75.0	30	62.6	28.8	3	36.5	46.2	35.7	30	11.0	5	58.7	33.6	0.05	—1.94	4,611	sw.	22	sw.	3	2	3	8	20
Lewiston	780	29.36	.....	30.18	30.46	2	29.91	31	0.55	47.9	+ 4.7	71.6	31	62.3	29.6	3	37.1	42.0	33.3	24	11.5	5	65.7	36.0	0.53	—0.65	1,616	se.	29	nw.	1	3	2	5	24
Spokane Falls	1,910?	28.12	+.14	30.26	30.50	7	29.98	20	0.52	45.7	+11.0	72.5	31	57.6	26.1	3	33.5	46.4	35.0	27	13.2	11	73.6	37.1	0.72	—0.38	3,177	sw.	28	sw.	2	5	2	9	20
Cœur d'Alene	.....	.....	.....	.....	.....	...	.....	...	.....	43.1	.....	70.0	31	56.7	21.0	5	29.0	51.0	.....	...	.....	...	.....	.....	0.70	.....	.....	.....	...	.....	...	4	...	...	...
Boisé City	2,750	27.31	.....	30.23	30.52	1	29.98	20	0.54	46.0	+ 2.7	68.4	30	58.6	27.7	3	34.8	40.7	29.9	8	13.2	11	61.8	32.3	0.03	—1.46	2,792	nw.	23	nw.	22	2	1	7	23
Linkville	.....	.....	.....	.....	.....	...	.....	...	.....	47.3	.....	70.0	15	61.4	23.0	3	33.2	47.0	.....	...	.....	...	.....	.....	0.61	.....	.....	.....	...	.....	...	3	...	...	...
Ashland	.....	.....	.....	.....	.....	...	.....	...	.....	52.5	.....	79.0	7	70.1	25.0	3	34.8	54.0	.....	...	.....	...	.....	.....	0.01	.....	.....	.....	...	.....	...	1	...	...	...
Fort Klamath	.....	.....	.....	.....	.....	...	.....	...	.....	43.8	.....	68.0	14	59.6	19.0	3	28.0	49.0	.....	...	.....	...	.....	.....	0.47	.....	.....	.....	...	.....	...	2	...	...	...
North Pacific coast region																																			
Astoria	.....	.....	.....	.....	.....	...	.....	...	.....	50.3	.....	67.0	7	57.0	36.0	2	43.6	31.0	.....	...	.....	...	.....	.....	1.51	.....	.....	.....	...	.....	...	10	...	...	...
Olympia	36	30.15	+.15	30.19	30.58	2	29.87	20	0.71	47.1	+ 3.0	70.0	17	59.3	30.0	3	37.7	40.0	37.0	17	7.0	22	83.5	41.8	0.59	—5.03	905	n.	12	ne.	16	6	9	14	8
Portland	67	30.09	+.12	30.17	30.61	2	29.86	8	0.75	52.0	+ 5.1	72.5	25	65.5	33.0	3	42.9	39.5	32.7	25	10.0	21	71.2	42.1	0.63	—6.25	2,425	nw.	18	ne.	17	7	6	8	17
Roseburg	511	29.60	+.11	30.17	30.60	2	29.84	16	0.70	50.8	+ 3.7	74.9	25	65.7	29.3	3	39.9	45.6	37.5	27	8.6	10	74.7	42.2	0.28	—3.67	1,219	nw.	13	sw.	10	4	3	16	12
Fort Canby	179	29.99	.....	30.19	30.62	2	29.86	10	0.75	49.5	.....	67.8	8	54.8	37.6	3	44.7	30.2	20.4	17	3.0	20	85.1	44.7	1.15	.....	5,791	w.	49	se.	17	10	11	10	10
Port Angeles	.....	30.17	.....	.....	.....	...	.....	...	0.08	44.7	.....	57.7	28	53.3	29.7	25	36.7	28.0	25.7	23	6.6	7	90.1	41.8	0.68	.....	.....	.....	...	.....	...	8	6	12	13
Tatoosh Island	.....	30.07	.....	30.17	30.55	2	29.83	8	0.72	47.5	.....	63.5	17	51.7	39.0	3	44.3	24.5	16.7	17	3.9	29	86.5	43.3	2.34	.....	9,119	e.	50	e.	7	10	13	10	8
Mid. Pacific coast region																																			
Cape Mendocino	637	29.43	.....	30.11	30.43	1	29.86	16	0.57	49.9	.....	70.1	7	55.0	41.2	16	45.0	28.9	20.8	6	3.9	20	84.9	45.1	0.34	.....	14,161	n.	56	se.	8	6	2	15	14
Red Bluff	332	29.74	+.08	30.08	30.40	1	29.75	23	0.64	60.9	+ 6.6	85.0	14	73.5	39.0	1	48.0	46.0	37.5	14	11.5	31	55.6	42.5	trace	—3.55	4,494	n.	30	s.	23	1	1	8	22
Sacramento	65	30.02	+.03	30.06	30.37	1	29.80	16	0.57	59.1	+ 4.7	77.0	7	70.5	45.8	1	50.2	31.2	28.0	7	13.0	31	65.2	46.4	0.08	—3.73	5,312	sw.	24	sw.	23	2	3	11	17
San Francisco	60	30.04	+.04	30.09	30.35	1	29.86	16	0.49	56.6	+ 3.2	76.0	7	63.3	49.5	14	52.1	26.5	21.0	7	6.1	19	76.1	48.4	1.01	—2.25	5,497	w.	26	w.	15	4	11	10	10
South Pacific coast region																																			
Los Angeles	371	29.70	—.01	30.05	30.29	1	29.88	16	0.41	60.6	+ 5.3	85.1	7	74.1	42.3	3	49.3	42.8	37.9	5	12.2	22	65.6	46.3	0.01	—3.43	3,561	w.	20	w.	19	1	5	12	14
San Diego	67	29.99	+.03	30.06	30.26	1	29.90	16	0.37	59.6	+ 4.3	80.8	7	68.0	42.5	2	51.4	38.3	32.4	5	8.3	29	72.9	50.0	0.78	—0.36	1,660	w.	18	w.	15	5	5	16	10
Yuma	141	29.84	+.01	29.96	30.34	1	29.79	16	0.56	67.2	+ 2.0	87.3	29	81.1	43.3	14	54.5	44.0	34.9	3	17.1	17	55.2	49.0	trace	—0.24	4,180	ne.	28	nw.	1	0	5	16	10

NOTE.—The record of maximum temperature on Mount Washington, N. H., covers from 21st to 31st. *128 miles.

north and to an altitude of 35°. When first observed it was of a pale yellow color, which afterwards grew brighter until 8.45, when streamers, 1° in width, shot upward to an altitude of 35°; these appeared and reappeared in succession, reaching their maximum brilliancy at 9 p. m.; at 9.10 none were visible, but shortly afterwards and until 9.25, "merry dancers" flashed from east to west with great rapidity; at 9.30 the display had entirely disappeared.

Pleasant Grove, Washington Territory, 15th: an aurora was observed at 7 p. m. in the form of an arch, above which appeared flashes of light resembling distant lightning.

East Portland, Oregon: a diffuse auroral light was visible in the north throughout the night of 15–16th.

Dayton, Washington Territory, 15th: a partial display of the aurora was visible from 10.40 p. m., until obscured by clouds at 11.45 p. m.

Bismarck, Dakota, 15th: an aurora was observed from 9.30 to 11.30 p. m.; the display being partly obscured by clouds.

Saint Vincent, Minnesota, 15th: at 8.30 p. m. a broad band of light extended from 170° to 270° azimuth, and to an altitude of 30°. At 10 p. m. it disappeared but again appeared at 10.40, when bright streamers shot upward from all points between 90° and 170° and extended to the zenith; the display lasted till daylight.

Fort Totten, Dakota, 15th: from 12.10 to 7 a. m. a pale yellow auroral arch was visible in the north. From 9 p. m. of the same date until midnight, there was an auroral display consisting of three parallel arches whose altitudes were 15°, 25° and 35°, respectively, the third arch being only partially formed; shooting beams were also observed.

Saint Paul, Minnesota, 15th: at 10.50 p. m. a faint auroral light in the form of an arch was observed covering the northern horizon and extending to an altitude of 35° at the centre; beneath the arch was of a dark slate color. The display remained unchanged until 11.50 p.m., when flashes of pale light traversed the arch in rapid succession from east to west. At 12.30 a. m. of the 16th numerous slender beams shot upward to an altitude of 65°, with a rapid motion from east to west; at 1 a. m., they rose to an altitude of 80°; at 1.10 a. m. the display began to fade.

Moorhead, Minnesota, 15th: a brilliant aurora was observed at 10 p. m. with beams of whitish light extending to the zenith; at 11 p. m. the beams faded away, leaving a segment of uniform white light, covering the northern sky to an altitude of 45°; this phase continued until midnight. At 12.20 a. m. the display revived and beams of light shot upward toward the zenith, rising and falling in quick succession; at 12.30 a. m. an arch appeared rising toward the zenith; after reaching an altitude of 50° it separated into numerous striated arches extending on either side of the zenith. It remained unchanged at 12.45 a. m. after which hour no observation was made.

Cresco, Iowa, 15th: an aurora was observed at 7.45 p. m; double at 8.30; beams in the northeast at 9 p. m; became brighter at 11 p. m.

Guttenburg, Iowa, 15th: the sky was covered until 10 p. m; when it cleared away an auroral display was observed; it consisted of a bright light with a few beams and a dark cloud below.

Keokuk, Iowa, 15th; when the sky cleared at 8 p. m. an aurora was visible consisting of an arch covering 60° of the horizon; the lower edge was well-defined and the upper edge indistinct. It disappeared at 11.15 p. m.

Dubuque, Iowa, 15th: an auroral display is reported to have been visible from 3 to 4.30 a. m.

Yankton, Dakota, 15th: a faint auroral arch of white light without streamers was visible after 9.30 p. m.

Huron, Dakota, 15th: bright auroral arch from 8 p. m. until after midnight.

Escanaba, Michigan, 15th: an aurora was observed at 6.55 p. m. and continued until the early morning of the 16th. There were two arches of bright yellow with "merry dancers" extending to within 20° of the zenith.

Alpena, Michigan, 15th: an aurora first appeared at 9.45 p. m. consisting of diffuse light on the northern horizon; no streamers were visible; the display ended at 10.50 p. m.

Mackinaw City, Michigan, 15th: a fine display of the aurora was visible from 7.45 p. m. until the early morning of the 16th.

Milwaukee, Wisconsin, 15th: a faint aurora was observed in the north from 8 to 10 p. m., becoming obscured by clouds at the latter hour.

Sandusky, Ohio, 15th: at 10 p. m. the northern sky presented a bright appearance through the clouds, being due to the presence of an aurora.

Toledo, Ohio, 15th: at 7.35 p. m. a brilliant aurora appeared; it consisted of clouds of white light from which luminous beams extended; the streamers were not observed after 8 p. m. but a yellow light remained visible until 3 a. m. of the 16th.

Oswego, New York, 15th: an aurora of whitish light was observed from 6.45 to 11 p. m., becoming obscured by clouds at the latter hour.

Rochester, New York, 15th: at 10.30 p. m. a faint auroral light was observed in the north-northeast, consisting of a pale yellow light without streamers or arch; the display continued until midnight.

Nashville, Tennessee, 15th: a faint aurora was first observed at 7.35 p. m. and disappeared at 8.25 p. m. The display consisted of numerous slender beams in the north-northwestern sky, covering about 20° of the horizon and extending upward 30°. The slender beams disappeared at 8.50 p. m., leaving a yellow light which extended about 5° above the horizon.

Variety Mills, Virginia, 15th: an aurora was observed at 7.35 p. m., consisting of a pale white light near the horizon from north to northwest. In a few minutes bands of streamers appeared, with rapid undulatory motion, and shooting upward 12° or 15° above the horizon. These quickly faded and were soon replaced by a steady, pale glow of light, which lasted some hours; no arch was seen.

Washington, District of Columbia, 15th: an aurora was observed at 9 p. m.; it consisted in a faint glow in the north, extending to 15° above the horizon and 30° on either side of the north point. It was hidden in ten minutes by clouds.

Burlington, Vermont, 15th: a very brilliant aurora was observed from 9 to 11 p. m. The whole of the northern sky, extending from a point in the northeast to a point about due west, and upward for about 30° above horizon, was brightly illumined, while frequent bright flashes of light appeared in the northwest.

Block Island, Rhode Island, 15th: a brilliant aurora, consisting of a white arch, very bright, and extending across the northern sky and to an altitude of 20°, was observed. Beneath the arch was a dark blue segment 10° in width, from which two columns of white light, 2° in width, extended upward to an altitude of 30°; these disappeared from the eastern horizon at 2 a. m., but later they reappeared in the northwestern sky. The display began at 1.45 a. m.; time of ending not known.

Point Judith, Rhode Island: at 11.50 p. m. on the 14th auroral beams began to stream upward from the northern horizon; they were of a faint yellow color, and extended to an altitude of 15°. The display remained unchanged until about midnight, but at 12.15 a. m. of the 15th a bright yellow arch appeared and remained until daylight. The arch, which was about 10° wide and of 8° altitude at the highest point, covered about 85° of the horizon, cutting the magnetic meridian at right angles.

Eastport, Maine, 15th: a brilliant auroral arch appeared at 12.15 a. m., extending across the northern horizon and to an altitude of 15°; beams shot upward to an altitude of 30°. The display continued until early morning.

New Haven, Connecticut, 15th: an aurora was observed from 2 until 3.15 a. m.; it consisted of a single streamer, which extended to a considerable altitude.

The following stations also reported the aurora of the 15th: Fallston, Maryland, at 9 p. m.; Woodstock, Maryland, at 8

p. m. until 10 p. m.; Lansing, Michigan, at 9 p. m.; Ann Arbor, Michigan, at 7 p. m., still visible at 10 p. m.; Manistique, Mottville, and Swartz Creek, Michigan; Northfield and Chester, Minnesota; North Volney, Ithaca, and Mountainville, New York; Statesville, North Carolina, from 7.30 to 8.30 p. m.; North Lewisburg and Wauseon, Ohio; Albany, Oregon, 8 p. m.; Dyberry and Catawissa, Pennsylvania; Dale Enterprise, Virginia, at 7 p. m.; Moorestown, New Jersey, 1 a. m.; Bainbridge Island, Washington Territory; North Colebrook, Connecticut, from midnight until morning; Norfolk, Connecticut, 2 a. m.; Webster, Dakota; Vevay and Spiceland, Indiana; Independence, Manchester, West Union, Humboldt, Oskaloosa, and Fort Madison, Iowa; Embarras, Sussex, and Prairie du Chien, Wisconsin, 8.45 p. m., 9 p. m., and 11 p. m., respectively.

The following is taken from "Nature" of April 9, 1885:

There was a considerable disturbance of the magnetograph recorded here on March 15, and had the photographic curves been developed on that day we should probably have predicted the occurrence of the aurora seen during the evening. The earth currents, which are necessary concomitants of magnetic disturbances, were probably intense enough to cause the disarrangement of the cable tests referred to by Mr. Willoughby Smith.

G. M. WHIPPLE.

Kew Observatory, Richmond, Surrey, April 7.

Auroras were also reported on the following dates:

5th.—New River Inlet, North Carolina, suspected; Sterling, Kansas.

6th.—New River Inlet, Portsmouth, Fort Macon, Smithville, and Cape Lookout, North Carolina; Mackinaw City, Michigan.

The observer at Fort Macon, North Carolina reports as follows: "At 7.35 p. m. horizontal beams of whitish color, turning to crimson, were observed in the sky from nw. to wnw., and, possibly, indicated the presence of an aurora; these bands of light continued until 8.10 p. m."

At Portsmouth, North Carolina, the observer reported that a faint display of auroral clouds was observed in the nnw. between 7.35 and 11.20 p. m. These clouds extended about 45° above the horizon and were about 12° degrees in width and of a pale yellow color; the bands of light extended horizontally and were very wide in the centre, tapering to a point at each end, with dark spaces between them. The bands of light had the appearance of luminous cirrus clouds.

7th.—Mackinaw City, Michigan, continuation of 6th.

13th.—Escanaba and Mackinaw City, Michigan.

14th.—Mackinaw City, Michigan, continuation of 13th; Portland, Maine; Point Judith, Rhode Island; Austin, Tennessee; Chester and Saint Vincent, Minnesota; Birmingham, Michigan.

16th.—Eastport, Maine; Independence, Iowa; Mackinaw City and Thornville, Michigan; Saint Vincent, Minnesota; Burlington, Vermont; Wytheville, Virginia.

17th.—Mackinaw City, Michigan, continuation of 16th; Wytheville, Virginia.

18th.—Wytheville, Virginia; Cedar Rapids, Iowa.

19th.—Bangor, Maine.

20th.—Marquette, Mackinaw City, Swartz Creek, and Alpena, Michigan; Humboldt, and Cresco, Iowa; Riley, Illinois; Prarie du Chien, Wisconsin; Saint Vincent, Minnesota; Westborough and Cambridge, Massachusetts; Eastport, Maine.

21st.—Eastport, Maine, continuation of 20th; Mackinaw City, Michigan, continuation of 20th; Saint Vincent, Minnesota, continuation of 20th; Riley, Illinois, suspected.

26th.—Mackinaw City, Michigan.

31st.—Birmingham, Michigan.

THUNDER-STORMS.

Thunder-storms are reported to have occurred in the various states and territories as follows:

Alabama.—Montgomery, 12th, 13th, 28th; Birmingham, 12th, 27th, 28th; Greensboro, 12th, 25th, 28th; Mobile, 26th.

Arizona.—Wickenburg, 9th, 11th to 14th, 19th, 25th; Prescott, 10th to 13th, 19th, 20th; Fort Grant, 9th, 10th, 12th, 13th; Fort Bowie, 8th, 14th, 19th; Fort Apache, 9th, 20th; San Carlos, 10th, 19th, 20th; Fort Thomas, 9th; Yuma, 13th; Fort Verde, 21st; Tucson, 19th.

Arkansas.—Fort Smith, 11th, 12th; Little Rock, 12th, 26th, 27th.

California.—San Diego, 12th, 13th; Poway, 12th.

Colorado.—West Las Animas, 11th, 13th, 26th; Montrose, 21st.

Florida.—Jacksonville, 13th, 21st, 28th; Cedar Keys and Newport, 21st; Sanford, 21st, 22d; Pensacola, 26th, 28th; Key West, 4th to 7th, 22d; Fort Barrancas and Tallahassee, 21st, 28th; Limona, 22d.

Georgia.—Augusta and Milledgeville, 12th, 28th; Savannah, 28th; Atlanta, Forsyth and Athens, 12th, 27th, 28th.

Idaho.—Boisé City, 15th; Cœur d'Alene, 16th.

Illinois.—Wilton Centre, 11th; Anna, Cairo, and Sandwich, 14th.

Indiana.—Indianapolis, Spiceland, and Vevay, 11th, 14th; Greencastle, Jeffersonville, and Sunman, 14th; Laconia, 14th, 31st; Fort Wayne, 13th, 16th; Guilford, 12th, 14th; Lafayette, 16th.

Indian Territory.—Fort Reno, 11th, 26th.

Iowa.—Manchester and Muscatine, 12th; Oskaloosa, 14th.

Kansas.—Leavenworth and Manhattan, 29th, 31st; Independence, 14th, 26th, 31st; Topeka, 6th, 29th; 31st; Clay Centre, 6th, 29th; Fort Scott, 14th, 31st; Wellington, 26th; Allison and Sherlock, 12th; Atchison and Salina, 29th; Wyandotte and Yates Centre, 31st.

Kentucky.—Louisville, 14th.

Louisiana.—New Orleans, 21st, 28th; Liberty Hill, 11th, 12th; Point Pleasant, 11th, 12th, 27th, 28th; Grand Coteau, 21st, 26th, 28th.

Maine.—Eastport, 1st.

Maryland.—Cumberland, 11th.

Michigan.—Lansing, 11th; Mottville, 11th, 14th.

Missouri.—Pierce City, 20th, 21st, 28th.

Nebraska.—Harvard and Red Willow, 12th; Stockham, 29th.

Nevada.—Carson City, 18th.

New Mexico.—Santa Fé, 13th; Fort Union, 13th, 21st.

New York.—Humphrey, 14th.

North Carolina.—New River Inlet, 5th; Wash Woods, 16th, 17th, 19th, 20th; Kitty Hawk, 18th; Chapel Hill, 27th; Smithville, 28th.

Ohio.—Columbus, Jacksonborough, North Lewisburg, and Westerville, 11th; Garrettsville, 11th, 30th; Cincinnati, Cleveland, and Portsmouth, 14th; Hiram and Ruggles, 30th.

Oregon.—Lakeview, 10th.

Pennsylvania.—Grampian Hills and Leetsdale, 11th; Fallsington, 16th.

Rhode Island.—Block Island, 4th.

South Carolina.—Statesburg, 27th, 28th; Aiken and Pacolet, 28th.

Tennessee.—Ashwood, 12th; Chattanooga, 12th, 27th; Nashville, 12th, 14th; Milan, 12th, 14th, 26th; Knoxville and Memphis, 12th, 27th, 28th.

Texas.—San Antonio, 12th, 13th, 15th, 20th; Palestine, 11th, 14th, 27th; Indianola, 11th, 14th, 15th, 20th; Galveston, 20th; Rio Grande City, 11th; Fort Stockton, 13th, 14th, 20th; Fort Davis, 10th, 20th; Fort Concho, 14th, 15th; Fort Elliot, 11th, 11th, 12th; El Paso, 10th; New Ulm, 12th, 14th, 15th, 20th, 21st, 22d; Cleburne, 7th, 11th, 14th; Huntsville, 12th, 14th, 25th.

Utah.—Salt Lake City, 21st.

Virginia.—Bird's Nest, 15th; Wytheville, 27th; Norfolk, 29th.

Washington Territory.—Spokane Falls, 15th.

West Virginia.—Helvetia, 11th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories as follows:

Arizona.—1st, 5th, 6th, 24th, 26th.

Arkansas.—3d to 6th, 18th, 19th, 20th, 31st.
California.—1st, 2d, 6th, 7th, 8th, 11th, 16th, 18th, 22d, 23d, 26th, 27th, 29th, 30th.
Colorado.—10th, 18th.
Connecticut.—1st, 6th, 9th, 11th, 18th, 23d, 24th, 25th.
Dakota.—1st, 4th, 8th, 10th, 30th, 31st.
District of Columbia.—4th, 5th, 23d, 24th, 30th.
Florida.—14th, 16th, 18th, 24th.
Georgia.—3d.
Idaho.—1st, 2d, 10th, 13th, 15th, 28th.
Illinois.—2d to 5th, 11th, 17th, 25th, 27th.
Indiana.—2d, 17th, 22d.
Iowa.—5th, 7th to 11th, 14th to 17th, 19th, 21st, 22d, 24th to 28th, 30th, 31st.
Kansas.—2d, 5th, 6th, 7th, 16th, 20th, 21st, 22d.
Louisiana.—30th.
Maine.—10th, 23d.
Massachusetts.—6th, 13th, 22d, 23d.
Michigan.—6th, 7th, 8th, 13th, 17th, 18th, 23d, 25th, 27th to 30th.
Minnesota.—5th.
Missouri.—5th, 16th, 18th, 20th, 24th, 28th.
Nebraska.—2d, 3d, 8th, 9th, 10th, 17th, 18th, 21st, 24th, 25th, 31st.
Nevada.—8th, 17th, 22d, 29th.
New Hampshire.—3d, 6th, 9th, 22d, 23d.
New Jersey.—23d.
New York.—3d, 7th, 9th, 11th, 22d, 25th, 28th.
North Carolina.—1st, 3d, 4th, 6th, 16th, 20th, 23d.
Ohio.—2d, 3d, 5th, 6th, 8th to 11th, 21st, 22d, 23d, 25th to 29th, 31st.
Oregon.—8th, 13th, 17th, 28th.
Pennsylvania.—6th, 11th, 17th, 21st, 28th.
Rhode Island.—11th, 24th.
South Carolina.—29th.
Tennessee.—3d, 14th, 23d, 24th, 30th, 31st.
Texas.—2d, 9th, 18th, 28th, 31st.
Utah.—9th, 17th, 23d, 30th, 31st.
Virginia.—4th, 5th, 23d, 24th, 28th, 30th, 31st.
Washington Territory.—3d, 14th.
Wisconsin.—5th, 16th, 17th, 21st, 23d, 27th, 30th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:
Alabama.—24th, 27th.
Arizona.—3d, 8th, 22d, 23d, 26th, 27th, 29th, 30th.
California.—1st, 2d, 5th, 7th, 8th, 22d, 23d, 24th, 26th, 28th, 29th, 30th.
Colorado.—23d.
Connecticut.—22d, 24th, 25th, 28th.
Dakota.—1st, 23d, 26th, 30th, 31st.
Florida.—24th, 27th, 30th.
Georgia.—27th, 30th.
Idaho.—6th, 28th.
Illinois.—2d, 24th, 26th, 27th, 28th, 30th.
Indiana.—2d, 21st, 22d, 25th, 27th, 29th, 30th.
Iowa.—24th to 29th, 31st.
Kansas.—1st, 22d to 28th.
Kentucky.—22d.
Louisiana.—27th.
Maine.—22d, 23d, 24th, 26th, 29th.
Maryland.—23d.
Massachusetts.—22d, 24th, 25th, 26th.
Michigan.—19th, 23d, 24th, 26th, 27th, 29th, 31st.
Minnesota.—25th, 29th.
Missouri.—22d, 24th.
Montana.—26th.
Nebraska.—1st, 3d, 21st, 22d, 23d, 26th, 27th, 29th.
Nevada.—1st, 22d, 23d, 24th, 29th.
New Hampshire.—3d.
New Jersey.—22d, 24th, 25th, 26th, 28th, 30th.
New Mexico.—29th.
New York.—3d, 6th, 22d to 25th, 28th.
North Carolina.—3d, 24th, 26th to 29th, 31st.
Ohio.—2d, 22d, 27th, 28th, 30th.
Oregon.—3d, 28th.
Pennsylvania.—1st, 22d, 25th.
Rhode Island.—4th, 5th, 24th, 30th.
South Carolina.—26th.
Tennessee.—2d, 3d, 24th.
Texas.—21st, 22d, 27th to 31st.
Utah.—1st, 7th.
Vermont.—28th.
Virginia.—1st, 3d, 29th, 30th, 31st.
Wisconsin.—23d, 27th, 28th, 30th, 31st.
Wyoming.—23d, 24th, 27th.

The phases of the moon during March were: last quarter, 8th, 1.48 p. m.; new moon, 16th, 12.31 p. m.; first quarter, 23d, 12.17 p. m.; full moon, 30th, 11.34 a. m.; apogee, 9th, 3.12 p. m.; perigee, 23d, 3.54 p. m.

MIRAGE.

Cedar Keys, Florida, 11th: the mainland and vessels appeared very near and distinct in the east and northeast.

Mackinaw City, Michigan, 8th: a very distinct mirage was observed at 9.30 a. m., the outlines of an island, seven miles east of station, being plainly visible; the phenomenon faded away about 10 a. m. On the 18th the image of islands reflected from the snow was much more distinctly observed than the outlines of the islands themselves, which could be seen beyond. On the 20th a mirage was also observed, and on the 23d a very distinct mirage was seen from 8 a. m. to 10.30 a. m.; it was first observed in the northeast. Islands which are ordinarily below the horizon, at a distance estimated at from eighteen to twenty miles, were distinctly seen, apparently within eight miles of this station. The phenomenon gradually extended to the east and southeast as the sun rose higher in the heavens. People crossing the straits report that the reflection of this shore from lake surface was at first taken for a strip of open water. All islands and coast lines were much elevated, while their reflection from the lake surface was very distinct. Another mirage was observed on the 29th.

Saint Vincent, Minnesota, 28th: a fine mirage was observed during the morning. The "Ridge," eighteen miles distant, and other objects not ordinarily visible, were plainly seen.

The following stations also report mirage:
Webster, Dakota, 7th, 19th, 21st, 22d, 24th, 27th, 28th, 31st
New London, Connecticut, 18th.
Sherlock, Kansas, 3d, 16th.
Salina, Kansas, 5th, 13th, 14th, 19th.
San Diego, California, 25th.

MISCELLANEOUS PHENOMENA.

DROUGHT.

Swanwick, Perry county, Illinois: at the close of March, many cisterns were dry, necessitating hauling of water for household uses. The continued cold and dry weather has seriously injured the wheat crop.

Cahuenga Valley, Los Angeles county, California, 31st: the past three months have been very warm and dry; at the close of March the crops were suffering and the farmers were cutting their wheat to be used as hay.

Salina, Saline county, Kansas: the cold and dry weather during March seriously injured the wheat crop in this section.

Mattoon, Coles county, Illinois, 31st: the weather was very dry during the whole month; very little rain has fallen in this vicinity during the last seventy-five days.

Ashland, Oregon; at the close of the month the weather was very dry and rain much needed.

The observer at San Diego, California, reported on the 5th that in Spring Valley and vicinity, ten miles east of that place, the wheat crop was much damaged in consequence of drought, no rain having fallen since the early part of January.

EARTHQUAKES.

Lancaster, Lancaster county, Pennsylvania: a heavy rumbling, which is supposed to have been due to an earthquake, was distinctly felt in this city shortly after 8 p. m., on the 8th. Buildings trembled and in some instances plates were shaken from stoves. In several churches the services were interrupted.

The "New York Herald" of March 19th, contained the following: Contoocook, New Hampshire, March 18, 1885. A distinct shock of earthquake was felt in this vicinity a few minutes past twelve o'clock to-day.

The Norwegian brig "Coulant," which arrived at Philadelphia on April 10th, reports having experienced a severe earthquake shock on March 22d, when in latitude N. 13° 22′, longitude W. 45° 30′.

The following reports relate to the earthquake which occurred in California on the 30th:

San Raphael, Marin county: at 11.30 p. m., there occurred three perceptible earthquake shocks lasting about twelve seconds; the vibration was apparently from southeast; the disturbance was sufficient to stop clocks; no damage resulted.

San José, Santa Clara county: a slight shock of earthquake occurred here at 11.35 p. m.; the motion was from east to west.

Salinas, Monterey county: at 11.45 p. m. two distinct shocks of earthquake, occurring in quick succession, were felt at this place; the vibration was apparently from north to south; the shocks were sufficiently severe to awaken persons from sleep.

The Signal Service observer at San Francisco reports the following:

A very light earthquake shock was felt in this city at 2.56 a. m. (75th meridian time), the vibration being apparently from east to west. The shock was quite generally felt in this vicinity. At Hollister several shocks were reported to have been felt during the night of the 30–31st. At Fall Brook, San Diego county, a slight earthquake was reported to have occurred at about 3 a. m. on the 31st.

METEORS.

The "Chico (California) Chronicle," of March 7th, contains a report of a remarkable meteor which struck the earth about six miles east of Chico during the night of the 5–6th. The report referred to states that the meteor lighted up the country for miles, and was accompanied by a noise like thunder. On the 6th a party numbering several persons instituted a search for the ærolite, which was found among the foot hills east of Chico. The meteoric body is reported as having a length a few inches over thirty feet, and a diameter of about two feet; it was of a slate color and of pyramidal shape; its weight is estimated at several tons. The meteor, in falling, struck upon a lava formation, which prevented it from going into the earth. After striking the lava bed it glanced about two hundred feet, leaving a furrow two feet deep for that distance. The body was found to be composed of a very hard substance, which resisted heavy blows made with a sledge-hammer without having the least scratch made upon it.

Dr. A. Fouch, voluntary observer at College City, Colusa county, California, has forwarded the following report of a meteor which was probably identical with that above referred to: "On March 5th, at about 10 p. m., when on my way to Berlin (a village five miles north of College City) I observed a meteor almost directly overhead. Its course was to the northwest, and when at an altitude of about 45° it exploded into several parts, which scattered in all directions; the report at its explosion was distinctly heard. The light produced by the meteor was as brilliant as that of an electric light and made it possible to have seen a needle on the ground." College City is situated about fifty miles southwest from Chico.

Alpena, Michigan, 10th, a large and very bright meteor was observed at 10.09 p. m.; its course was from west to east, moving very rapidly and leaving a trail of about 30° in length. When the meteor was within 50° of the horizon it exploded, leaving a very brilliant trail, which remained visible about fifty seconds.

Burlington, Vermont: the most brilliant meteor seen in this section for many years, was observed in the northwestern sky at 9 p. m. on the 21st; its brightness illuminated the heavens in all directions. When near the earth a large fragment fell from the main body which remained intact, and passed beneath the horizon.

San Francisco, California: on the 28th at 10.4 p. m. a large meteor was observed moving in a southeasterly direction and leaving a short train.

Meteors were also observed at the following places:

Fort Thomas, Arizona, 10th.

Lead Hill, Arkansas, 1st, 18th.

Cedar Rapids, Iowa, 22d.

Allison, Kansas, 3d, 5th, 6th, 8th, 9th, 10th, 13th, 14th, 15th, 17th, 27th.

Sterling, Kansas, 17th.

Sherlock, Kansas, 21st.

Richmond, Kentucky, 5th.

Rowe, Massachusetts, 6th.

Madison, Nebraska, 12th.

Tiffin, Ohio, 11th.

Pittsburg, Pennsylvania, 22d.

MIGRATION OF BIRDS.

Geese flying southward.—Elk Falls, Kansas, 1st; Independence, Kansas, 6th; Grand Haven, Michigan, 29th; Fort Custer, Montana, 15th.

Geese flying northward.—Fort Sully, Dakota, 31st; Fort Buford, Dakota, 30th; Webster, Dakota, 27th, 29th, 31st; Lewiston, Idaho, 14th; Edgington, Illinois, 12th, 15th, 27th, 28th, 30th; Fort Reno, Indian Territory, 14th; Guilford, Indiana, 11th; Monticello, Iowa, 30th; Round Grove, Iowa, 4th; Independence, Kansas, 1st, 2d, 30th; Manhattan, Kansas, 3d; Leavenworth, Kansas, 5th; Wellington, Kansas, 10th; Clay Centre, Kansas, 1st, 2d; Yates Centre, Kansas, 1st, 2d, 17th, 25th, 26th; Salina, Kansas, 21st, 23d, 25th; Allison, Kansas, 2d, 3d, 6th, 8th, 9th, 10th, 13th, 16th, 17th, 20th, 21st, 24th, 30th; West Leavenworth, Kansas, 3d, 18th, 24th; Eastport, Maine, 31st; Emmitsburg, Maryland, 1st; Mottville, Michigan, 28th; Detroit, Michigan, 27th; Red Willow and Madison, Nebraska, 4th; De Soto, Nebraska, 2d, 3d; Genoa, Nebraska, 2d, 9th; New River Inlet, North Carolina, 10th; Lakeview, Oregon, 1st; Albany, Oregon, 14th, 18th; Point Judith, Rhode Island, 5th; San Antonio, Texas, 30th; Indianola, Texas, 16th, 27th; Cleburne, Texas, 3d, 18th; Dale Enterprise, Virginia, 6th.

Ducks flying southward.—Kitty Hawk, North Carolina, 24th.

Ducks flying northward.—Bismarck, Dakota, 20th; Fort Sully, Dakota, 31st; Huron, Dakota, 22d; Anna, Illinois, 1st; Edgington, Illinois, 13th, 14th, 16th, 26th, 27th, 30th; Des Moines, Iowa, 12th; Allison, Kansas, 6th; Yates Centre, Kansas, 2d, 3d, 4th, 7th, 13th, 14th, 18th, 19th, 28th; West Leavenworth, Kansas, 10th; Lamar, Missouri, 1st; Genoa, Nebraska, 9th; Palermo, New York, 8th; Mountainville, New York, 5th; Kitty Hawk, North Carolina, 10th; Indianola, Texas, 27th.

Cranes flying northward.—Forsyth, Georgia, 9th; Des Moines, Iowa, 30th.

Brents flying northward.—West Leavenworth, Kansas, 3d, 10th, 25th.

PRAIRIE AND FOREST FIRES.

Sherlock, Kansas, prairie fires were observed southwest from station during the night on the 17th and 19th; also on the 21st, showing an unbroken line, from west to north, probably fifty miles in length.

Yankton, Dakota, 13th, 16th to 19th, 24th, 25th, 26th, 29th, 30th, 31st.

Burlington, Iowa, 17th, northeast of station; also 19th, 20th, 31st.

Pike's Peak, Colorado, 5th, 11th, and 19th, extensive, about thirty-five miles east and southeast of station, moving eastward; also on 31st, northeast of station, apparently east of Denver.

Fort Reno, Indian Territory, 1st, 2d, 3d, 5th to 9th, 15th to 22d, 29th, 30th.
North Platte, Nebraska, 14th, 15th.
De Soto, Nebraska, 26th, 31st.
Genoa, Nebraska, 30th.
Fort Totten, Dakota, 19th, northwest of station.
Fort Sully, Dakota, 13th, 14th, 31st.
West Las Animas, Colorado, 19th.
Fort Elliott, Texas, 31st.
Moorestown, New Jersey, 25th.
Wilmington, North Carolina, 9th, 11th.

During the night of the 17–18th, a fire occurred in the woods in Suffolk county, Long Island, and burned over an area of three square miles of timber land.

POLAR BANDS.

Polar bands were reported during the month by the following stations:

Lead Hill, Arkansas, 23d.
Sacramento, California, 8th, 12th.
Montrose, Colorado, 6th, 11th, 20th.
Bismarck, Dakota, 15th.
Indianapolis, Indiana, 17th.
Guttenburg, Iowa, 22d.
Leavenworth, Kansas, 15th.
Maud, Kansas, 2d, 3d, 14th, 20th, 29th, 30th, 31st.
Yates Center, Kansas, 2d, 3d, 18th, 20th.
Portland, Maine, 22d.
Emmitsburg, Maryland, 15th.
Amherst, Massachusetts, 12th, 18th,
Somerset, Massachusetts, 23d.
Moorestown, New Jersey, 21st.
Mountainville, New York, 12th.
Wauseon, Ohio, 5th, 11th, 17th, 20th, 27th.
Point Judith, Rhode Island, 12th, 18th.
Providence, Rhode Island, 12th.
Nashville, Tennesse, 1st.
El Paso, Texas, 7th, 13th, 29th.
Rio Grande City, Texas, 2d, 28th.
Woodstock, Vermont, 22d, 23d, 24th.
Dale Enterprise, Virginia, 4th.
Wytheville, Virginia, 3d, 18th, 31st.

SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for March, 1885:

Date—Mar., 1885.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
2, 12 m	2	25‡	0	0	0	0	5	90‡	Many of the spots small.
3, 5 p. m.	0	0	0	0	0	0	5	90‡	Do.
4, 10 a. m.	2	5	0	0	2	5	6	140‡	Do.
5 p. m.	0	0	0	0	0	0	6	130‡	Do.
5, 4 p. m.	0	20‡	0	0	0	0	6	150‡	Do.
6, 11 a. m.	0	2	0	0	0	0	6	120‡	Do.
8, 4 p. m.	0	0	.....	.....	0	0	6	65‡	Do.
5 p. m.	0	0	0	0	0	0	6	60‡	Do.
10, 11 a. m.	2	5	.....	.....	2	5	6	25‡	
11, 12 m	1	5	2	5‡	1	3	6	20‡	
12, 3 p. m.	0	0	2	5‡	0	0	4	15‡	
13, 4 p. m.	2	5‡	0	0	1	1	6	20‡	
14, 12 m	0	0	0	0	0	0	5	15‡	
16, 3 p. m.	0	0	0	0	0	0	5	15‡	
17, 1 p. m.	0	0	1	2	0	0	4	12‡	
18, 11 a. m.	1	2	0	0	1	2	4	15‡	
21, 11 a. m.	1	1	.....	.....	1	1	3	3	
22, 6 p. m.	0	0	1	2	0	0	0	0	
23, 5 p. m.	0	0	0	0	0	0	0	0	
24, 12 m	3	3	0	0	0	0	3	3	
25, 5 p. m.	1	9	0	0	1	2	3	12	
26, 4 p. m.	1	13‡	0	0	1	12	4	25‡	
28, 11 a. m.	0	20‡	0	0	.....	.....	3	40‡	
30, 1 p. m.	0	20‡	0	0	0	0	3	60‡	
31, 12 m	1	1	0	0	1	1	3	50‡	

Faculæ were seen at the time of every observation. ‡Approximated.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and sixty-five stations show 5,065 observations to have been made, of which three were reported doubtful; of the remainder, 5,062, there were 4,431, or 87.5 per cent., followed by the expected weather.

SAND STORM.

Fort Thomas, Arizona, 8th.

WATER-SPOUTS.

On March 12th, in latitude N. 33° 24′, longitude W. 73° 38′, Captain W. G. Shackford, of the s. s. "Acapulco" observed a water-spout at 9 a. m.

The brig "Mary Fink," Captain Daniel B. Darrah, in N. 29° 13′, W. 79° 17′ reports having observed a large water-spout astern of the vessel, moving from southwest to east, and distant about three miles; four large, and several small water-spouts were also observed to the eastward on the same date.

The brig "L. F. Munson," J. H. Smith, master, reports having observed on the 17th, several water-spouts between N. 31° 55′, W. 75° 34′ and N. 33° 16′, W. 74° 57′.

NOTES AND EXTRACTS.

The following extract is from the March, 1885, report of the "Alabama Weather Service," under direction of Prof. P. H. Mell, jr.:

The month of March has been cold and dry with few hard winds, reversing its usual character for heavy rains and violent winds. The temperature was nine degrees below the normal, frosts were frequent and the ground was frozen several times. This cold March following a cold winter has retarded the progress of all vegetation. In north Alabama the wheat crop has been destroyed by the unusual cold; corn was not generally planted until the last week of the month; plum and peach trees were just beginning to bloom at that time, and gardens are reported as fully a month behind. In central Alabama the season is well described by our correspondent at Greensboro: "Our forests are still bare, although our earliest forest trees generally begin to bud the first week in March. A very few peach trees in the warmest exposures and common plum trees began blooming the second week in March, but most of our peach trees bloomed about the 31st, while only a few pear trees opened their first buds by the 31st. Red maples and early elms began blooming the second week in March. No corn is up and no cotton is planted. This the most backward spring we have had, perhaps, since 1855." In south Alabama the young corn just coming up was seriously injured by the severe cold of the 23d, and a large percentage had to be replanted; truck farmers have lost heavily by the backward season, and all farm work is retarded by the continued cold weather and frequent rains, and it is feared that the corn has been planted so late that it will interfere with the cotton crop, as both will require attention at the same time. The 23d was the coldest day recorded for March since 1873.

The average rainfall was four inches below the normal. There were five rainless days. The rainfall for south Alabama nearly doubled that of the other sections of the state.

There was no rain on the 16th, and all stations report a clear view of the eclipse.

State summary.

Mean temperature, 49°.8; highest temperature, 82° at Eufaula on the 28th; lowest temperature, 14°, at Gadsden on the 23d; range of temperature, 68°; greatest monthly range of temperature, 56° at Gadsden; least monthly range of temperature, 30° at Fayette; mean daily range, 15°.6; greatest daily range of temperature, 42° at Gadsden on the 3d; least daily range of temperature, 0° at Clintonville on the 18th, and Bolling on the 25th, and Carrollton on the 22d.

Mean depth of rainfall, 2.99 inches; mean daily rainfall, 0.096; greatest depth of monthly rainfall, 6.36 inches at Mobile; least depth of monthly rainfall, 1.29 inches at Tuscumbia; greatest daily rainfall, average for the state, 0.76 of an inch, on the 28th; greatest local daily rainfall, 3.05 inches at Clintonville on the 28th.

Days of general rainfall, 1st, 4th, 12th, 21st, 25th, 27th, 28th; average number of days on which rain fell, 9; average number of cloudy days, 11; average number of fair days, 8; average number of clear days, 12; warmest days, 12th, 28th, 31st; coldest day, 23d.

Prevailing direction of wind, northwest.

Snow fell in north Alabama on the 8th to a depth of two inches; it extended as far south as Lafayette; an additional slight fall of snow is reported on the 17th at Mount View, Tuscumbia, Florence, and Centre.

The month was remarkably free from heavy gales. Mobile reports that the greatest force of wind was 26 miles an hour from the west; Montgomery, 23 miles from the northwest; Chattanooga, 22 miles from the northwest. Some stations report strong winds accompanying the thunder-storm of the 28th; and the newspapers state that on that day a small tornado did much damage at Sidney, thirty miles from Mobile.

Thunder-storms were general on the 12th, 27th, and 28th; hail is reported

Meteorological record of voluntary observers and army post surgeons—March, 1885.

Station.	Temperature			Rainfall.
	Mean.	Maximum.	Minimum.	
Fort Preble, Me	23.8	49	7	2.49
Orono, Me	19.2	49	−21	2.78
Cornish, Me	21.1	48	−10	2.00
Gardiner, Me	20.8	50	−14	2.18
Contoocook, N. H	23.7	56	−16	0.82
Charlotte, Vt	19.5	50	−14	0.50
Burlington, Vt	19.3	48	−17	0.86
Woodstock, Vt	17.8	52	−27	1.55
Dorset, Vt	19.8	53	−16	1.44
Lunenburg, Vt	15.6	48	−24	2.25
Newport, Vt	16.0	48	−30	2.42
Strafford, Vt	17.9	44	−18	1.80
Amherst, Mass	25.8	54	− 3	1.25
Milton, Mass	.....	55	5	1.40
New Bedford, Mass	27.7	54	2	1.39
Somerset, Mass	28.2	58	0	1.14
Leicester, Mass	21.6	53	− 5	1.02
Williamstown, Mass	17.4	48	−14	0.96
Westborough, Mass	27.3	60	0	1.05
Fall River, Mass	27.4	56	5	1.20
Princeton, Mass	21.0	49	− 4	1.41
Rowe, Mass	18.4	51	−16	1.30
Taunton, Mass	28.3	57	4	1.07
Worcester, Mass	23.5	51	1	0.90
Providence, R. I	26.4	59	2	1.02
Nayatt Point, R. I	.....	58	2	0.83
Hartford, Conn	26.7	56	− 1	0.93
Norfolk, Conn	19.7	52	−10	1.52
Southington, Conn	25.9	58	0	0.87
North Colebrook, Conn	17.5	52	− 6	2.70
Mountainville, N. Y	25.3	54	− 4	0.70
Humphrey, N. Y	18.1	45	−12	1.39
Palermo, N. Y	17.1	48	−19	0.09
Auburn, N. Y	18.9	50	−10	1.33
Menand, N. Y	22.5	45	− 6	0.84
Ithaca, N. Y	21.4	52	−14	0.49
Le Roy, N. Y	31.8	53	− 7	0.83
Cooperstown, N. Y	18.3	54	−14	0.55
North Volney, N. Y	18.6	50	− 9	0.90
Factoryville, N. Y	21.8	54	−10	0.33
White Plains, N. Y	29.9	53	1	2.30
Fort Niagara, N. Y	21.5	48	− 3	0.73
Fort Columbus, N. Y	29.5	56	7	1.73
West Point, N. Y	26.7	53	− 5	2.40
Madison Barracks, N. Y	18.0	40	−21	0.92
Plattsburg Barracks, N. Y	16.6	46	−22	0.30
Fort Hamilton, N. Y	30.1	55	5	0.43
David's Island, N. Y	28.9	53	5	0.28
Phillipsburg, N. J	31.3	65	2	0.78
Somerville, N. J	29.0	59	6	0.83
Vineland, N. J	31.8	94	7	0.91
Moorestown, N. J	29.7	63	6	1.08
Dover, N. J	25.7	54	3	1.45
Princeton, N. J	29.2	58	4	1.31
South Orange, N. J	28.9	62	8	0.81
Salem, N. J	33.0	65	13	1.00
Wellsborough, Pa	22.4	52	−12	1.15
Fallsington, Pa	29.1	59	7	1.19
Grampian Hills, Pa	20.1	48	−10	1.34
Troy, Pa	21.5	57	− 8	0.03
Dyberry, Pa	19.5	48	−18	1.03
Blooming Grove, Pa	.....	53	10	0.95
Catawissa, Pa	28.5	58	0	1.04
Germantown, Pa	.....	56	7	1.20
Easton, Pa	25.9	60	10	.....
Westchester, Pa	28.8	62	4	1.34
Wilkes Barre, Pa	25.6	57	− 3	0.90
Chambersburg, Pa	28.2	62	8	0.91
Quakertown, Pa	26.4	52	2	1.21
Altoona, Pa	32.4	62	3	0.44
South Bethlehem, Pa	27.6	57	2	2.04
Franklin, Pa	19.6	40	−12	1.70
Mahanoy Plane, Pa	27.9	55	2	0.39
Haverford College, Pa	.....	50	5	0.78
Drifton, Pa	21.5	51	− 6	0.76
Cumberland, Md	32.7	66	6	1.30
McDonogh, Md	31.7	89	7	1.25
Emmitsburg, Md	33.0	60	7	1.94
Fallston, Md	30.6	60	8	1.44
Great Falls, Md	33.9	68	11	1.28
Fort McHenry, Md	32.4	64	10	1.24
Woodstock, Md	30.6	67	6	0.79
Dale Enterprise, Va	32.1	70	7	1.72
Wytheville, Va	37.0	65	10	1.49
Variety Mills, Va	37.1	71	9	1.22
Accotink, Va	37.3	72	10	1.22
Blacksburg, Va	39.0	69	7	3.10
Fort Monroe, Va	39.4	66	18	1.36
Marion, Va	34.3	65	13	2.20
Bird's Nest, Va	40.1	68	15	3.00
Lenoir, N. C	.....	68	15	1.30
Lincolnton, N. C	40.7	.....	.....	3.30
Statesville, N. C	45.7	69	20	2.15
Weldon, N. C	41.2	70	10	2.26
Chapel Hill, N. C	42.9	75	17	3.50
Stateburg, S. C	48.3	67	26	1.64
Aiken, S C	49.6	71	28	2.46
Pacolet, S. C	44.1	61	29	2.75
Milledgeville, Ga	49.8	75	24	3.32
Forsyth, Ga	51.7	76	32	3.79
Quitman, Ga	.....	77	34	3.70
Athens, Ga	47.4	70	20	3.37
Manatee, Fla	65.2	92	46	4.20
Archer, Fla	58.7	79	33	3.75
Mayport, Fla	59.9	85	40	3.02
Newport, Fla	54.7	79	32	4.48
Limona, Fla	64.4	85	39	1.46
Fort Barrancas, Fla	57.6	79	31	8.55
Saint Augustine, Fla	58.0	82	34	3.37
Green Springs, Ala	48.2	74	24	2.01
Mt. Vernon B'ks, Ala	55.5	80	25	7.89
Birmingham, Ala	47.8	74	21	.....
Greensboro, Ala	51.1	75	28	2.92
Point Pleasant, La	51.3	78	30	5.16
Luling, La	.....	81	32	5.79
Grand Coteau, La	59.4	78	36	5.37
New Ulm, Tex	58.0	80	35	2.14
Cleburne, Tex	49.2	79	20	2.82
Fort Brown, Tex	66.1	85	47	0.55
Clarkesville, Tex	54.9	80	31	3.50
Comfort, Tex	.....	.....	.....	1.28
Fort Concho, Tex	55.5	83	30	1.35
Huntsville, Tex	.....	77	34	4.51
Austin, Tex	59.2	70	41	2.22
Mount Ida, Ark	48.4	78	22	2.20
Lead Hill, Ark	45.5	84	18	3.60
Helvetia, W. Va	32.6	65	− 4	2.54
Austin, Tenn	43.2	70	16	1.59
Ashwood, Tenn	44.4	74	16	2.70
Greenville, Tenn	41.0	72	14	4.30
Maryville, Tenn	44.0	70	20	2.55
Andersonville, Tenn	41.0	62	14	2.48
Careyville, Tenn	41.0	71	14	2.38
Sweetwater, Tenn	40.0	70	12	2.23
Parksville, Tenn	43.0	71	21	2.49
Grief, Tenn	41.0	74	17	2.21
Fostoria, Tenn	40.0	72	16	1.30
Cookville, Tex	40.0	72	14	2.26
Manchester, Tenn	39.0	72	6	2.88
Riddleton, Tenn	40.0	73	17	2.17
Beech Grove, Tenn	40.0	72	5	2.91
Flat Creek, Tenn	42.0	71	10	2.53
Florence Station, Tenn	43.0	72	18	3.21
Howell, Tenn	43.0	73	15	2.12
Hardison's Mills, Tenn	42.0	70	9	2.71
Hurricane Switch, Tenn	42.0	67	15	2.52
Pulaski, Tenn	45.0	78	18	1.75
Kingston Springs, Tenn	42.0	78	9	2.36
Dickson, Tenn	41.0	75	6	1.83
Sailors Rest, Tenn	40.0	.....	18	2.18
Paris, Tenn	43.0	74	16	1.65
Savannah, Tenn	44.0	73	20	1.87
McKenzie, Tenn	43.0	74	12	1.30
Henderson, Tenn	45.0	75	15	3.06
Dresden, Tenn	42.0	70	.....	1.10
Milan, Tenn	43.7	76	5	1.94
Trenton, Tenn	42.0	74	8	2.46
Bolivar, Tenn	45.0	72	22	1.56
Dyersburg, Tenn	43.0	76	12	1.67
Woodstock, Tenn	47.0	76	20	2.50
Somerville, Tenn	45.0	78	22	2.43
Covington, Tenn	45.0	71	23	1.46
Richmond, Ky	36.0	71	10	1.04
Frankfort, Ky	36.7	74	10	1.31
Ruggles, Ohio	26.2	53	− 7	0.27
Hiram, Ohio	23.1	50	− 7	1.30
Tiffin, Ohio	27.2	58	− 4	0.89
Canton, Ohio	25.6	54	− 7	0.99
Westerville, Ohio	25.8	60	0	1.05
North Lewisburg, Ohio	30.1	60	− 2	0.80
College Hill, Ohio	32.2	73	0	0.53
Jacksonborough, Ohio	30.2	62	6	1.22
Wooster, Ohio	27.0	57	− 4	1.24
Wauseon, Ohio	24.5	56	− 7	0.62
Portsmouth, Ohio	35.0	74	7	1.02
Garrettsville, Ohio	23.8	52	−18	1.37
Yellow Springs, Ohio	30.0	62	− 1	0.58
Oberlin, Ohio	25.5	54	− 9	1.52
Dayton, Ohio	31.0	63	− 3	0.36
New Bremen, Ohio	28.9	64	− 3	0.91
Sidney, Ohio	27.9	62	− 3	0.50
Upper Sandusky, Ohio	28.4	59	− 3	1.36
Quaker City, Ohio	29.6	58	− 6	1.57
Warren, Ohio	24.5	54	−10	0.53
Levering, Ohio	26.5	56	− 6	0.97
Junction, Ohio	25.5	58	− 6	0.95
Gambier, Ohio	27.2	56	− 2	0.64
Ironton, Ohio	36.5	76	3	1.09
Washington C. H., Ohio	28.7	67	0	0.33
Waverly, Ohio	33.3	71	5	1.00
O. S. University, Ohio	29.4	64	5	0.98
Logan, Ohio	29.8	59	2	0.40
Marietta, Ohio	33.1	67	4	1.21
McConnelsville, Ohio	30.5	64	3	0.81
Pomeroy, Ohio	35.7	68	8	0.89
Granville, Ohio	28.5	58	− 2	0.45
Lafayette, Ind	29.6	64	− 3	0.46
Fort Wayne, Ind	31.0	57	1	0.50
Logansport, Ind	29.6	64	− 3	2.15
Laconia, Ind	.....	74	11	0.77
Sunman, Ind	32.9	68	0	0.35
Jeffersonville, Ind	36.4	74	13	1.13
Guilford, Ind	32.7	70	0	0.37
Spiceland, Ind	30.1	64	− 1	0.72
La Grange, Ind	23.4	.....	− 8	0.83
Vevay, Ind	35.7	75	8	1.57
Wabash, Ind	30.0	60	2	0.92
Monticello, Ind	26.8	59	− 4	0.60
Connersville, Ind	30.9	66	3	0.72
Franklin, Ind	32.2	67	4	0.42
Farmland, Ind	28.6	60	− 2	0.49
Mauzy, Ind	29.0	63	− 2	0.83
Knightstown, Ind	29.9	67	− 2	0.49
Richmond, Ind	30.0	64	− 2	0.71
Columbus, Ind	33.6	71	6	0.32
Marengo, Ind	38.6	78	12	0.75
Blue Lick, Ind	35.4	73	10	1.02
Huntingburg, Ind	36.7	71	14	0.98
Princeton, Ind	35.4	75	6	0.40
Worthington, Ind	34.4	69	7	0.30
Degonia Springs, Ind	37.9	75	15	0.83
Salem, Ind	34.9	72	5	1.85
Corydon, Ind	37.2	73	11	0.87
Mattoon, Ill	34.5	70	8	0.58
Bunker Hill, Ill	36.6	75	11	0.42
Collinsville, Ill	38.3	74	12	0.45
South Evanston, Ill	24.6	.....	− 2	0.46
Sycamore, Ill	25.7	.....	− 1	0.55
Sandwich, Ill	29.0	61	− 3	0.62
Wilton Centre, Ill	26.7	63	− 4	0.63
Charleston, Ill	.....	64	4	0.12
Peoria, Ill	34.1	64	10	0.42
Swanwick, Ill	38.2	77	12	0.92
Anna, Ill	40.7	79	13	1.43
Rockford, Ill	26.8	54	− 2	0.20
Riley, Ill	24.8	56	− 4	0.39
Fort Brady, Mich	7.3	39	−27	1.44
Hudson, Mich	20.6	50	−10	0.25
Boyne, Mich	12.4	49	−34	2.32
Manistique, Mich	12.6	50	−29	3.38
Moorestown, Mich	14.3	45	−32	1.39
Ann Arbor, Mich	31.7	40	− 6	1.28
Birmingham, Mich	21.0	46	−13	0.89
Ionia, Mich	21.5	48	−13	1.21
Traverse City, Mich	.....	46	−24	2.29
Harrisonville, Mich	.....	45	−22	1.48
Kalamazoo, Mich	.....	48	− 8	1.07
Thornville, Mich	21.0	49	−11	1.15
Swartz Creek, Mich	20.0	45	−13	0.95
Lansing, Mich	21.6	46	−10	0.60
Northport, Mich	.....	54	−18	0.30
Embarras, Wis	20.2	52	−15	1.40
Sussex, Wis	22.0	51	− 8	1.02
Beloit, Wis	26.3	56	− 3	0.21
Neillsville, Wis	15.0	41	−20	0.50
Manitowoc, Wis	23.3	48	−11	0.65
Madison, Wis	24.9	54	− 5	0.62
Prairie du Chien, Wis	27.3	52	− 6	0.16
Wausau, Wis	19.3	47	−17	0.83
Fort Snelling, Minn	24.2	50	− 7	0.25
Minneapolis, Minn	23.7	49	− 7	0.64
Chester, Minn	.....	47	−16	0.85
Northfield, Minn	24.7	50	−12	0.81
Monticello, Iowa	27.2	62	− 7	0.22
Cresco, Iowa	21.4	48	−15	0.75
Des Moines (near), Iowa	33.0	65	3	.....
Humboldt, Iowa	.....	60	− 1	0.12
Indianola, Iowa	32.2	63	2	trace
Mount Vernon, Iowa	29.4	62	− 4	.....
Independence, Iowa	27 6	50	− 1	0.53
Logan, Iowa	32.5	53	.....	0.30
Ottumwa, Iowa	32.2	62	10	0.03
Manchester, Iowa	28.5	60	−10	0.33
Maynard, Iowa	21.2	50	−16	.....
Cedar Rapids, Iowa	28.1	60	− 2	0.61
Fort Madison, Iowa	.....	65	3	0.00
Guttenberg, Iowa	25.3	56	−14	0.41
Muscatine, Iowa	31.0	61	3	0.25
West Union, Iowa	23.8	51	−11	1.07
De Soto, Nebr	34.7	66	7	0.28
Fort Robinson, Nebr	37.3	69	0	0.65
Fremont, Nebr	33.0	67	8	0.33
Red Willow, Nebr	.....	75	14	0.28
Ogalalla, Nebr	38.0	72	10	.....
Genoa, Nebr	33.0	67	8	0.34
Nebraska City, Nebr	35.8	64	9	0.35
Tecumseh, Nebr	38.1	66	13	0.33
Crete, Nebr	34.9	70	10	0.17
Falls City, Nebr	37.6	68	14	.....
Syracuse, Nebr	36.8	67	12	0.18
Weeping Water, Nebr	33.8	68	7	.....
Central City, Nebr	33.0	70	12	0.20
West Point, Nebr	.....	97	.....	0.25
Dawson, Nebr	36.4	68	14	0.25
Superior, Nebr	35.4	68	13	.....
Madison, Nebr	32.3	60	7	0.59
Stockham, Nebr	.....	70	.....	0.45
Ashland, Nebr	.....	68	.....	0.31
Fairbury, Nebr	.....	68	14	0.75
Independence, Mo	37.2	63	12	0.40
Greenfield, Mo	44.0	70	20	0.50
Pierce City, Mo	41.2	79	17	1.90
Springfield, Mo	42.1	76	11	2.10
Conception, Mo	36.7	63	2	0.10
Centreville, Mo	.....	76	0	1.49
Carthage, Mo	.....	79	20	1.45
Chamois, Mo	40.6	70	18	0.51
Warrenton, Mo	39.6	70	17	.....
Glasgow, Mo	36.5	68	14	0.34
Houstonia, Mo	39.8	70	14	0.86
Ironton, Mo	40.9	78	22	1.55
Mascoutah, Ill	40.3	74	10	0.56
Kirksville, Mo	35.1	63	6	0.01
Curryville, Mo	.....	74	10	0.62
Lexington, Mo	36.9	67	12	0.42
Louisiana, Mo	35.7	70	12	0.10
Mexico, Mo	.....	66	12	0.38
Miami, Mo	39.0	74	13	0.45
Oregon, Mo	37.1	75	11	0.40
Pleasant Hill, Mo	.....	67	14	0.50
Steelville, Mo	.....	80	10	0.88
Sedalia, Mo	39.6	72	13	0.65
Sherrill, Mo	41.0	79	14	1.91
Atchison, Kans	38.7	70	17	0.25
Independence, Kans	43.1	78	21	1.31
Yates Centre, Kans	40.4	77	14	1.16
Wyandotte, Kans	44.0	72	16	0.48
Salina, Kans	.....	74	16	0.03
Emporia, Kans	41.2	75	14	0.74
Clay Centre, Kans	40.7	75	12	0.38
Fort Scott, Kans	43.0	78	18	1.75
W. Leavenworth, Kans	.....	72	16	1.20
Maud, Kans	42.5	78	21	1.03
Wellington, Kans	41.0	80	18	2.02
Allison, Kans	37.8	77	14	0.68
Topeka, Kans	40.0	77	14	1.02
Lawrence, Kans	40.6	73	15	0.87
Elk Falls, Kans	.....	.....	18	1.00
Manhattan, Kans	37.9	65	12	0.35
Sherlock, Kans	42.3	74	17	0.80
Sterling, Kans	37.5	82	14	0.38
Holton, Kans	37.5	70	10	0.09
Richardton, Dak	25.6	48	− 6	1.09
Fort Yates, Dak	27.8	56	−10	0.18
Fort Totten, Dak	18.7	39	−20	0.28
Fort Sisseton, Dak	22.7	49	−16	0.40
Fort Sully, Dak	34.0	67	3	0.15
Fort Randall, Dak	34.6	68	0	0.13
Fort Pembina, Dak	14.4	41	−25	0.75
Fort A. Lincoln, Dak	23.4	49	−15	0.90
Fort Meade, Dak	31.9	64	− 1	0.52
Webster, Dak	27.6	70	−24	0.71
Vermilion, Dak	.....	64	0	trace
Pueblo, Colo	41.3	73	20	0.40
Colorado Springs, Colo	38.5	68	16	0.12
Fort Lewis, Colo	34.0	54	13	1.04
Fort Lyon, Colo	43.0	75	17	0.10
Fort Keogh, Mont	37.8	64	2	0.36
Fort Ellis, Mont	34.2	64	10	0.54
Fort Shaw, Mont	41.3	71	9	0.35
Fort Assiniboine, Mont	40.1	70	9	0.13
Fort Fred Steele, Wyo	32.6	62	− 5	0.70
Fort Bridger, Wyo	34.4	60	10	0.05
Fort Union, N. Mex	39.1	69	7	0.42
Fort McDermitt, Nev	44.3	70	24	0.26
Poway, Cal	57.3	87	37	0.34
Hydesville, Cal	51.7	78	42	0.24
Princeton, Cal	62.8	85	40	.....
Salinas, Cal	55.1	82	36	0.19
Blue Lake, Cal	53.4	78	33	1.45
Oakland, Cal	50.9	76	43	1.07
Oroville, Cal	68.2	86	46	0.25
San Raphael (near), Cal	.....	80	32	1.03
Tower House, Cal	60.0	88	40	.....
Sacramento, Cal	58.5	80	37	0.09
Fall Brook, Cal	58.2	86	41	0.29
Alcatraz Island, Cal	54.7	75	43	0.38
Angel Island, Cal	59.2	91	48	0.89
Benicia Barracks, Cal	57.7	76	47	0.47
Fort Bidwell, Cal	46.6	75	20	0.04
Presidio of S. F., Cal	55.1	78	43	0.78
Fort Mason, Cal	58.5	75	49	0.40
Eola, Oreg	52.4	72	34	0.55
Bandon, Oreg	.....	60	29	.....
Albany, Oreg	53.1	75	32	0.81
East Portland, Oreg	.....	74	30	trace
Fort Klamath, Oreg	41.8	69	17	0.24
Pleasant Grove, Wash. T	.....	75	18	.....
Bainbridge Island, W. T	47.5	70	33	0.77
Fort Townsend, Wash. T	50.7	66	39	0.36
Kinowick, Wash. T	.....	84	28	0.04
Tacoma, Wash. T	48.2	68	32	1.01

by Mount View, Union Springs, Florence, Centre, Tuscaloosa, and Birmingham on the 12th; on the 28th by Jacksonville and Clintonville; on the 27th by Mount Willing.

All stations report heavy dew or fog on the 14th.

The 5th, 6th, 10th, 11th, 17th, and 19th were hazy days.

The last general frosts of the month were on the 29th and 30th. Ice formed in north Alabama on the 8th, 9th, 10th, 16th, 18th, 20th, 23d, and 24th; in central Alabama on the 8th, 9th, 10th, 23d, and 24th: in south Alabama on the 9th and 23d.

Lunar halos were reported on the 3d and 24th by Chattanooga, on the 24th by Mobile, and on the 27th by Montgomery.

Solar halos were reported on the 3d and 23d by Chattanooga.

The rosy sunsets still attract attention.

The following meteorological summary for March, 1885, is taken from the report of Hon. J. T. Henderson, Commissioner of Agriculture for Georgia.

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Mean.	
	°	°	°	
Northern Georgia	72.0	12.0	45.2	3.09
Central Georgia	75.0	24.0	49.7	2.95
Southern Georgia	82.0	28.0	53.5	3.51
State	82.0	12.0	49.5	3.18

The following meteorological summary for March, 1885, is from the report of Mr. Charles F. Mills, director of the "Illinois Weather Service."

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Mean.	
	°	°	°	
Northern counties	64.0	—4.3	30.6	0.38
Central counties	75.0	8.0	34.9	0.38
Southern counties	80.0	8.0	38.9	0.78
State	80.0	—4.3	34.8	0.48

The following meteorological summary and accompanying remarks are from the March, 1885, report of the "Indiana Volunteer Weather Service," under direction of Professor W. H. Ragan, of De Pauw University, Greencastle:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Monthly mean.	
	°	°	°	
Northern counties	64.0	—10.0	26.9	0.95
Central counties	67.0	— 3.0	30.6	0.65
Southern counties	78.0	0.0	36.0	0.81
State	78.0	—10.0	31.2	0.80

Rains occurred on the 10th in southern counties; 11th, in southern and central counties; 12th, 14th, 30th, in all sections and on the 31st, in the central counties.

Snows were reported in all sections on the 1st, 6th, 7th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 28th, 29th, generally very light.

The heaviest rains, and in many counties in the centre and south, thunderstorms, attended the passage of the low of the 14th. This low first appeared on the 13th, at midnight, in Manitoba, and moved southeast until south of Lake Superior, then east. It was central a little north of Alpena, Michigan, on the night of the 14th, and is not shown on the map of the 16th. A high barometer followed which was central north of Dakota on the 16th and moving slowly southeast produced the lowest temperatures of the month at nearly all stations, on the morning of the 20th. The highest temperatures were recorded on the 31st, attending a low that originated west of and near Lake Michigan on the 30th, and passed to the northeast, being central north of the lakes on the morning of the 31st.

From all stations the temperature is reported as having been far below the normal and the precipitation extraordinarily small.

No storm centre passed across the state during the month, and we had consequent immunity from dangerous storms of any kind.

The average wind velocity at Greencastle was nearly ten miles per hour, the total being 7,091 miles, which we expect will be found from future observations to be much below the normal. The total velocity at Indianapolis was 4,990 miles.

Coming as the prolongation of an unusually cold winter the low temperature of March was felt severely. The average temperature for the four months at Greencastle was 25°.3, which is that normal for the period covered about three or four hundred miles further north.

At Indianapolis eleven Marches corresponded substantially with the preceding winters as to temperature, and two did not; ten agreed with February and three did not; at Logansport the same comparison gives eighteen to five and fifteen to eight; at Spiceland, fourteen to eight and fourteen to eight; and at Vevay, fifteen to six and fifteen to six. This substantial agreement of succeeding months, if well established, will become of great importance, as we view it.

Observations continued at Saint Louis, Missouri, for forty-eight years show nine winters, the average temperature of which was from 4° to 7° above the normal, twenty-six with a departure of 2° or less, and eleven from 3° to 8° below. The warmest was that of 1844–'45, mean 40°.4; and the coldest 1884–'85, mean 25°.1.

The following meteorological summary and accompanying remarks are from the March, 1885, report of the "Indiana Weather Service," under direction of Prof. H. A. Huston, of Purdue University, Lafayette:

Districts.	Temperature.			Precipitation.
	Highest.	Lowest.	Mean.	
	°	°	°	
Northern counties	64.0	— 9.5	27.3	0.82
Central counties	69.0	— 3.0	30.8	0.60
Southern counties	78.0	5.0	35.8	0.96
State	78.0	— 9.5	31.3	0.79

The mean temperature of the state for March, 31°.29, was 8°.51 below that for last year, 8°.24 below the mean of fourteen years at Indianapolis, 5°.95 below the mean of nine years at Wabash, 5°.48 below the mean of three years at Worthington, 12°.95 below the mean of seven years at Blue Lick, 9°.05 below the mean of twenty-six years at Logansport, and 4°.50 below the mean of six years at this station.

The mean precipitation for the state, 0.79 inches, was 1.95 below that of last year; 3.09 below the mean of fourteen years at Indianapolis; 2.39 below the mean of nine years at Wabash; 1.02 below the mean of three years at Worthington; 2.66 below the mean of twenty-six years at Logansport, and 1.64 inches below the mean of six years at this station.

The mean snowfall for the state, 4.92 inches, is 0.81 inch greater than that of last year.

The ranges of temperature and pressure are less than for last month.

Eleven lunar and two solar haloes are reported. The dates vary widely. On the morning of the 15th the wind reached a velocity of 44 miles per hour at this station. The month has been remarkable for low temperatures and slight rainfall.

The following is taken from the March, 1885, report of the "Louisiana Weather Service," under direction of Mr. Robert S. Day:

The month was abnormally cold, frost being general throughout the greater portion of the state with each cold wave. The mean temperature at New Orleans and Shreveport was the lowest on record for March since the Signal Service was established. The precipitation was not excessive, being about the average. While very backward, the spring has been so far favorable to farm work preparatory to staple crops. The land everywhere is said to break well and to be in excellent condition.

State summary.

Mean temperature for March, 57°; highest temperature, 86°, Cheneyville, 12th, Franklin, 13th; lowest temperature, 27°.8, Delta, 23d; greatest daily range, 53°, Lake Providence, 18th; least daily range, 5°, Vidalia, 15th.

Average rainfall, 4.60 inches; greatest daily rainfall, 2.55 inches, New Iberia, 21st; greatest rainfall for month, 6.99 inches, New Orleans.

Average rainy days, 7.2.

Storms: Delta, 8th, 12th, 18th, 22d; Port Eads, 1st, 4th, 9th, 22d.

Frosts were general in the northern and western parishes on the 3d, 9th, 10th, 16th, 17th, 18th, 23d, 24th, and in the southwestern parishes on the 9th, 10th, and 23d

The following is an extract from the March, 1885, report of the "Minnesota Weather Service," under direction of Prof. W. W. Payne, of the Carleton College, Northfield:

March, like the three preceding months, opened with a mild temperature and decreasing pressure. The lowest barometrical readings of the month were quite generally noted at 9 p. m. of the 2d, and 7 a. m. of the 3d.

Bird Island, 9 p. m., 2d, 29.608; Saint Paul, 7 a. m., 3d, 29.436; Northfield, 7 a. m., 3d, 29.440; Red Wing, 7 a. m., 3d, 29.450.

This mild term continued until the night of the 14–15th, when the wind, on the approach of a storm centre from the northwest, gradually increased to a gale from the south, causing a rapid rise in the temperature. During the a. m. of the 14th the wind shifted to the northwest causing a rapid fall in the temperature, accompanied by a gradual increase in pressure. From the 14th to the 26th the temperature remained much below the normal, and

the minimum temperatures of the month at all stations were observed as follows:

Saint Paul, —5.8 on the 16th; Minneapolis, —7.0 on the 16th; Northfield, —12.5 on the 21st; Red Wing, (lowest observation, no minimum at station) —6.0 on the 17th; Bird Island, —7.0, on the 16th; Park Rapids, —19.6 on the 16th; Sherburne, (lowest observation, no minimum at station) —4.0 on the 16th.

From the 26th to end of month there was a marked increase in temperature. The snow melted rapidly and the ice in the rivers and lakes began to soften and break up.

The precipitation of the month was much below the normal. At no station was there as much as 1.00 measured. It occurred mostly in the form of snow, and chiefly on the 3d, 5th, 6th, 20th, 25th, 26th and 29th. At the end of the month, with the exception of the extreme northwest portion of the state, there was but little snow on the ground except in heavy drifts.

The following is the March, 1885, report of the "Missouri Weather Service," under direction of Prof. Francis E. Nipher, Saint Louis:

The mean temperature of March has been 40°.1 at the Central station, which is 3°.6 below the normal March temperature. Since 1837 March has been as cold as during last month fourteen times, the coldest occurring in 1843, when it was 12°.6 colder than during the last month.

The lowest temperature reached was 14°, on the 22d. This has often been exceeded before. On March 3, 1848, the minimum thermometer read 0°, and on March 14, 1867, it read 1°, and in 1873 it read as low as 13°.5 on the 26th of the month. The temperature fell below 32° on twelve days, and on three days it did not rise above 32°.

The marked feature of the month was the small precipitation, which was 0.49 inch. of water, which is less than was ever before observed at Saint Louis in March. The smallest heretofore observed was 0.79 inch, in 1853. The normal March rainfall is 3.74.

In the state the rainfall has also been small, being most in the southern part of the state, where the maximum rainfall reported was 2.1, at Springfield. The northern part of the state was exceedingly dry, the least fall of 0.01 being reported from Kirksville.

The lowest temperature reported was 0°, at Centreville, the observer being quite emphatic in order to avoid the charge of error in reporting. The minimum at other southern stations was, Steelville, 11°; Springfield, 10°; while Greenfield reports 20° and Ironton 22°.

Chamois reports: The temperature has been 2°.31 below the normal of twelve years, and the precipitation 1.87 inch below the average for six years. The severe cold weather of the winter and the dry weather of February and March has injured wheat very much. The wheat having been frozen out of the ground needed rain to reset it. So far as I have examined or heard peaches are all killed.

Lexington reports: wheat not in good condition. Much of it killed or greatly damaged.

Houstonia.—Ground about thawed out. It was frozen three feet or over.

Oregon.—Wheat on bottom-lands good; on up-lands badly damaged by freezing and dry weather.

Glasgow.—Wheat looks badly. Peaches all killed.

Louisiana.—I have nothing encouraging to say about the wheat now in the ground.

Greenfield.—Very little wind for March.

The following is an extract from the March, 1885, report of the "Nebraska Weather Service" under direction of Professor Goodwin D. Swezey, of Doane College, Crete:

The most marked feature of the month has been its lack of rain and snow the snowfall being the smallest, and the precipitation the smallest with one exception—that of March, 1882—of any March since our records were begun in 1878. The number of cloudy days has been correspondingly less, and of clear days more.

The temperature has not been unusual, being about a degree less than the normal; nor has it been at all a marked month in respect to wind, nor to storms of hail, thunder and lightning, or rain and snow.

The average of rain and melted snow, chiefly the latter, for the different sections of the state for March, 1885, is as follows: northeast section, 0.30 inch; southeast section, 0.23; northwest section, 0.34; southwest section, 0.24. Greatest number of days of appreciable precipitation, six, at Omaha.

The following is an extract from the March, 1885, bulletin of the "New England Meteorological Society," under direction of Prof. Winslow Upton, Providence, R. I.:

Summary.

The following discussion of the meteorological conditions for the month is based upon reports from one hundred and three observers, and upon the current publications of the United States Signal Service.

General conditions.—The month has been characterized by a greater amount of fair weather and less wind than is usual in March. Two features especially distinguished the month from the corresponding month of former years, viz., the small precipitation and the low temperature. The latter condition, added to the similar low temperatures of February and the last half of January, closes a season of remarkable severity. At Worcester, Massachusetts, the continued cold is unexampled in the forty-seven years of continued observation, and it is probable that a similar result would be found at other stations, were the records examined. The observations at Gardiner, Maine, Cambridge and Wooster, Massachusetts, Providence, Rhode Island, and New Haven, Connecticut, which cover a long succession of years, show that the average temperature of the three months, January, February, and March, 1885, was 5°.2 below the average, and of the four months, December, 1884—March, 1885, 3°.3 below the average. The month closed with warmer weather, but the frost in the ground in southern New England extended to a depth of two or three feet, and good sleighing continued in the northern section.

Precipitation.—The precipitation was deficient to a marked degree. Thus, at Lowell, Massachusetts, the amount was but 36 per cent. of the average; at New York, 33 per cent.; at Waltham, Massachusetts, 14 per cent., and at the summit of Mount Washington, 15 per cent. The deficiency is less in the eastern portion of the district, and Eastport, Me., and Saint John, N. B., report an excess. This is due to the heavy precipitation at these stations in the storms of the 2d, 10th, 16th, and 19th. The form was largely snow, the greatest amounts reported being 24.0 inches at Chelsea, Vt., and 34.6 inches at Saint John, N. B. At the close of the month no snow remained on the ground on the southern coast. At Chelsea, Vt., on the 15th, a depth of 43 inches was noted in the woods.

Temperature.—The unusually low average temperature of the month was the result of steady cold with but few single records of great severity. The temperature reached zero, however, at nearly all stations. The month was the coldest March on record at Gardiner, Me., Burlington, Vt., and Worcester, Mass., at which continuous records of nearly half a century have been consulted.

Pressure.—The barometric records of the month were characterized by the usual conditions. Several depressions moved in the vicinity of New England, the chief of which were those of the 1st–3d, 9th–11th, and 14th–16th, which moved from the lake region easterly to the Atlantic. Two depressions which moved northeasterly in the Atlantic were east of the New England coast on the 19th and 23d, respectively. No high areas of unusual extent prevailed, that of the 12th and 13th, between the second and third depressions just mentioned, having been attended by the maximum cold at the majority of stations.

Wind.—The greatest wind velocities of the month were at Block Island, Rhode Island, 46 miles per hour on the 20th; at Eastport, Maine, 47 miles on the 16th; at Blue Hill, Massachusetts, 57 miles on the 10th; at Mount Washington, 128 miles on the 21st, which is greater than any record in January or February, 1885. The total wind movement for the month at Blue Hill, Massachusetts, was 15,852 miles; at Mount Washington, 26,005 miles.

Miscellaneous.—Few auroras were noted; those reported are: at Burlington, Vermont, 15th and 16th; Chelsea, Vermont, 15th; Cambridge, Massachusetts, 20th.

Indications of spring were observed near the close of the month. Robins and bluebirds were first seen at Hartford, Connecticut, on the 26th; at Providence and Newport, Rhode Island, and Worcester, Massachusetts, on the 27th; at Amherst, Massachusetts, on the 28th.

Thunder and lightning were observed at Eastport, Maine, and Saint John, New Brunswick, on the 1st, and at Provincetown, Massachusetts, on the 4th.

The comparison of the observations at Blue Hill observatory and the signal office at Boston shows that at Blue Hill the mean temperature was 4°.0 lower, the mean relative humidity 7 per cent. greater, and the monthly wind movement 54 per cent. greater than at Boston.

Through the kindness of Mr. George F. Pierce, of Boston, the following extract is made from the diary of Col Samuel Pierce, of Dorchester, referring to the weather in March, 1785:

"27th. We went to meeting in the sley, the snow in many places 2, 3, and 4 foot deep and exceeding hard.

"30. The weather cold and a vast body of snow on the ground.

"31st. There has not been one night this month but it has frose."

The following summary is taken from an advance report of the "Ohio Meteorological Bureau" under direction of Professor T. C. Mendenhall:

Atmospheric pressure.—Mean for the state (reports from twenty-three stations), 30.08; station reporting highest monthly mean, Dayton, 30.14; station reporting lowest monthly mean, Portsmouth, 29.92; station reporting the highest barometric reading, Cincinnati, 30.47 on the 23d; station reporting the lowest barometric reading, Hiram, 29.41 on the 14th; station reporting largest monthly range, Wauseon, .98; station reporting least monthly range, Ironton, .68.

Temperature.—Mean for the state, (reports from thirty-four stations), 28°.3; highest monthly mean, 36°.5 at Ironton; lowest monthly mean, 23°.1, at Hiram; maximum temperature, 76° on the 31st, at Ironton; minimum temperature —9°.8 at Warren, on the 21st; monthly range for the state, 85°.8; stations reporting greatest monthly range, College Hill and Ironton, 70°; station reporting least monthly range, Logan, 57°.

Precipitation.—Average for the state, (reports from thirty-three stations) 0.86 inch; station reporting largest, Quaker City, 1.57 inches; station reporting smallest, Washington Court House, 0.23 inch.

The following is an extract from the March, 1885, report

of the "Tennessee Weather Service," under direction of Hon. A. J. McWhirter, Nashville.

The month of March presented several anomalous features, among which were the low temperature, the small amount of rainfall, the depth of the snowfall, and the absence of high winds.

The mean temperature was 42°.57, 6°.43 below that of March, 1884, and only 8°.80 above that of February, which was abnormally low. The mean of maximum temperatures was 72°.63, and that of the minimum temperatures was 21°.4, respectively 2°.37 and 6°.07 less than the means for the corresponding period of last year. The highest temperature was, with perhaps one or two exceptions, recorded on the 31st, and the lowest was generally recorded on the 18th.

The average precipitation was 2.34 inches, 5.56 inches less than that for March of last year. This was, perhaps, the smallest amount that has fallen during the month of March for many years past, and much of this amount was supplemented by the excessive snowfall. The actual precipitation from rain alone would show a remarkable low amount for the month. The distribution of the precipitation over the state was pretty equal, with a slight preponderance in favor of the eastern division, which received an average of 2.52 inches, the middle division receiving 2.38 inches, and the western division 2.12 inches. Some of the heaviest local rains, and some of the deepest snowfalls, however, were reported from the last-named division. The days of the greatest precipitation were the 7th, 12th, 17th, 21st, 27th, and 28th, the 12th showing the greatest amount for one day. These rains were all general. The 2d, 3d, 10th, 20th, 30th, and 31st were free from precipitation.

The mean depth of snowfall was 6.25 inches, and the greatest depth for the month was 12 inches, reported at Milan. This snowfall was largely in excess of the average for March. The distribution was quite equal throughout the state, the days of the falls being generally the 7th, 8th, 17th, 19th, 21st, and 22d. The heaviest fall was on the 17th.

Frosts were reported at most of the stations on the 2d, 3d, 6th, 8th, 9th, 11th, 16th, 18th, 23d, 24th, 26th, 29th, and 30th, of these the 6th, 8th, 9th, 16th, 18th, 23d, 24th, 25th, and 29th were heavy, the last-named being the heaviest of the month.

Thunder-storms were reported as follows: Greeneville, 27th; Maryville, 12th, 5.30 p. m.; Careyville, 27th, sw., 28th, n.; Grief, 12th, 28th; Parksville, 12th, 7.30 p. m., nw., 27th, 28th; Farmingdale, 12th, 28th, w. to e.; Fostoria, 12th, 28th; Manchester, 12th 28th; Riddleton, 12th; Flat Creek, 12th; Florence Station, 12th, 2.20 p. m., sw.; Howell, 12th, p. m.; Nashville, 12th, 14th; Hardison's Mills, 12th, 14th; Hurricane Switch, 12th, 8.20 a. m., 14th, 9 p. m., nw. and w.; Pulaski, 12th, 28th; Kingston Springs, 28th; Ashwood, 12th; Dickson, 12th, s. to e., 14th, w., 28th; Savannah, 12th; McKenzie, 14th, 26th; Milan, 12th, 14th, 26th; Trenton, 12th, 14th, 26th; Bolivar, 12th, 3 to 6 a. m.; Somerville, 12th, a. m.; Dyersburg, 12th, 26th, latter 9.30 p. m., w. with zigzag lightning; Woodstock, 12th, 2.30 a. m., w.

State summary.

Mean temperature, 42°.57; highest temperature, 78°, on the 31st, at Pulaski, Kingston, Springs, and Somerville; lowest temperature, 5°, on the 18th, at Beech Grove and Milan; range of temperature, 73°; mean monthly range of temperature, 57°.45; greatest monthly range of temperature, 71°, at Milan; least monthly range of temperature, 44°, at Maryville; mean daily range of temperature, 16°.7; greatest daily range of temperature, 42°, on the 9th, at Covington, and on the 11th at Kingston Springs; least daily range of temperature, 1°, on the 1st, at Andersonville, on the 12th at Cookeville, on the 15th at Sweetwater, and on the 22d at Hardison's Mills and Pulaski; mean of maximum temperatures, 72°.63; mean of minimum temperatures, 15°.33.

Mean depth of rainfall, 2.34 inches; mean daily rainfall, .075 inch; greatest rainfall, 4.30 inches, at Greeneville; least rainfall, 1.30 inches, at Fostoria and McKenzie; greatest local daily rainfall, 2.00 inches on the 27th, at Greenville.

Days of greatest rainfall, 7th, 12th, 17th, 21st, 27th, 28th; day of greatest rainfall during month, 12th; average number of days on which rain or snow fell, 10; average number of clear days, 11.1; average number of fair days, 8.5; average number of cloudy days, 11.4; average depth of snowfall during the month, 6.25 inches; greatest depth of snowfall during the month, 12 inches, at Milan; coldest day, 18th; warmest day, 31st.

Prevailing direction of wind, north.

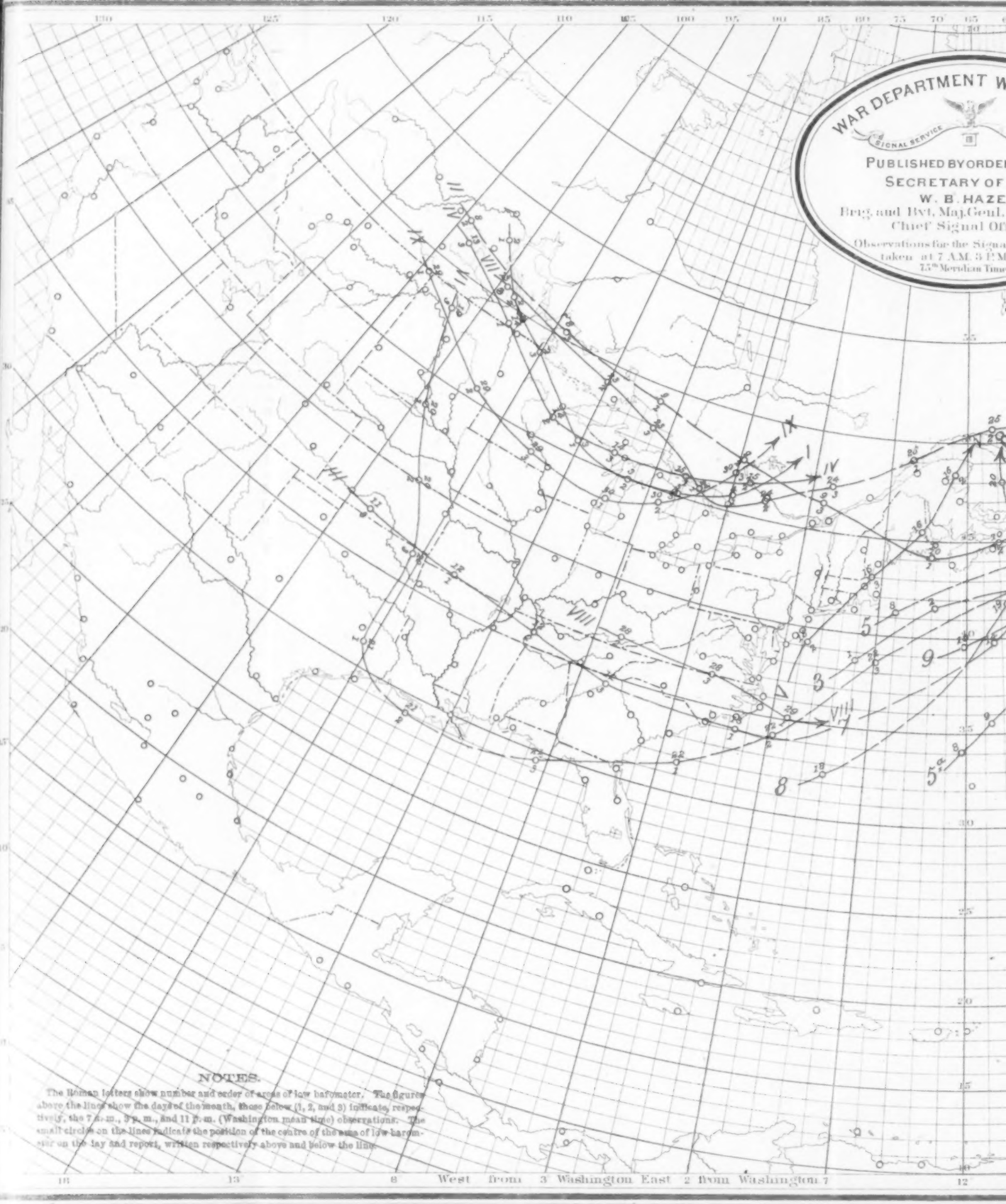
ERRATA.

Respecting the meteor reported by the bark "Innerwick," at Victoria, B. C., published on page 51 in the REVIEW for February, 1885, later reports show the vessel's position to have been N. 37°, E. 170° 15′.

On page 34 of the February REVIEW, under "Ocean ice," in the table showing the limits of ice in former years, the southern limit in February, 1882, should read N. 43° 10′, W. 49 00′, and the eastern limit N. 46° 26′, W. 41° 25′.

No. 606 C 1884

Chart I. Tracks of Low-Barom


WAR DEPARTMENT W
SIGNAL SERVICE
PUBLISHED BY ORDE
SECRETARY OF
W. B. HAZE
Brig. and Bvt. Maj. Genl.
Chief Signal Of
Observations for the Signa
taken at 7 A.M. 3 P.M
75th Meridian Time
NOTES.
The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month, those below (1, 2, and 3) indicate, respectively, the 7 a. m., 3 p. m., and 11 p. m. (Washington mean time) observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
West from 3 Washington East 2 from Washington 7

arometer Areas. March, 1885.

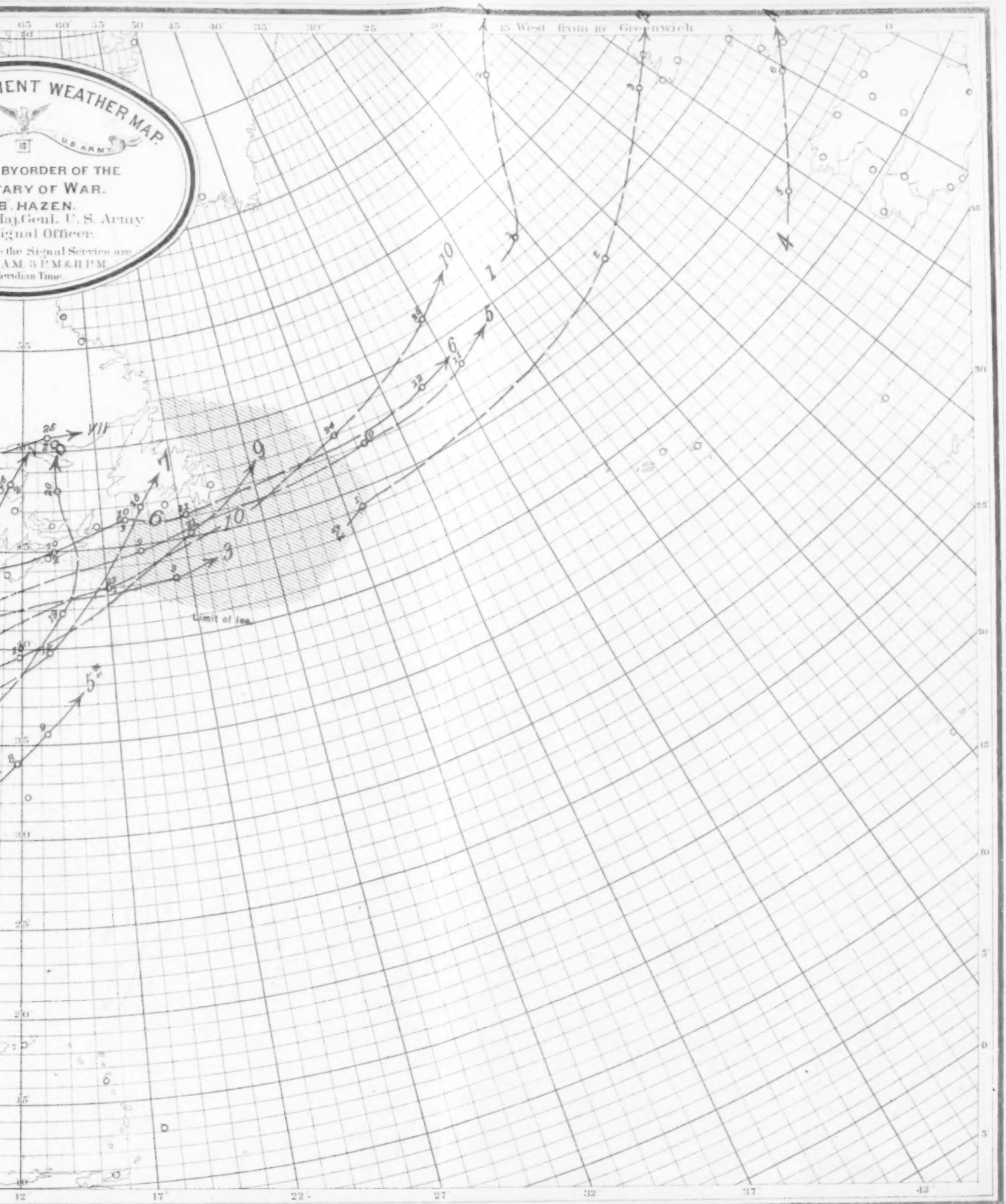


Chart II. Isobars, Isotherms, and Winds. March, 1883.

Form 106 F.

Chart II. Isobars, Isotherms, and Winds. March, 1885.

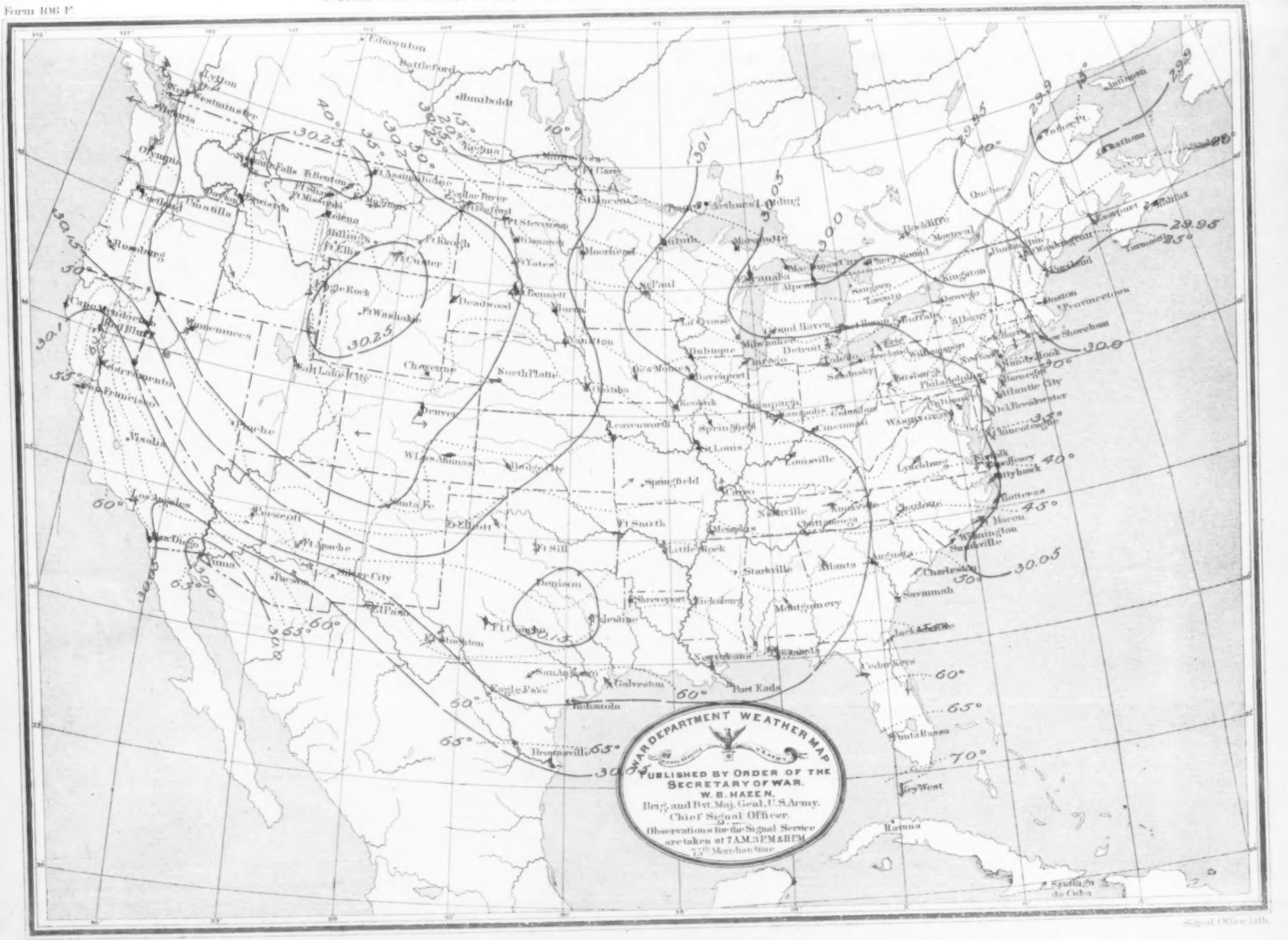
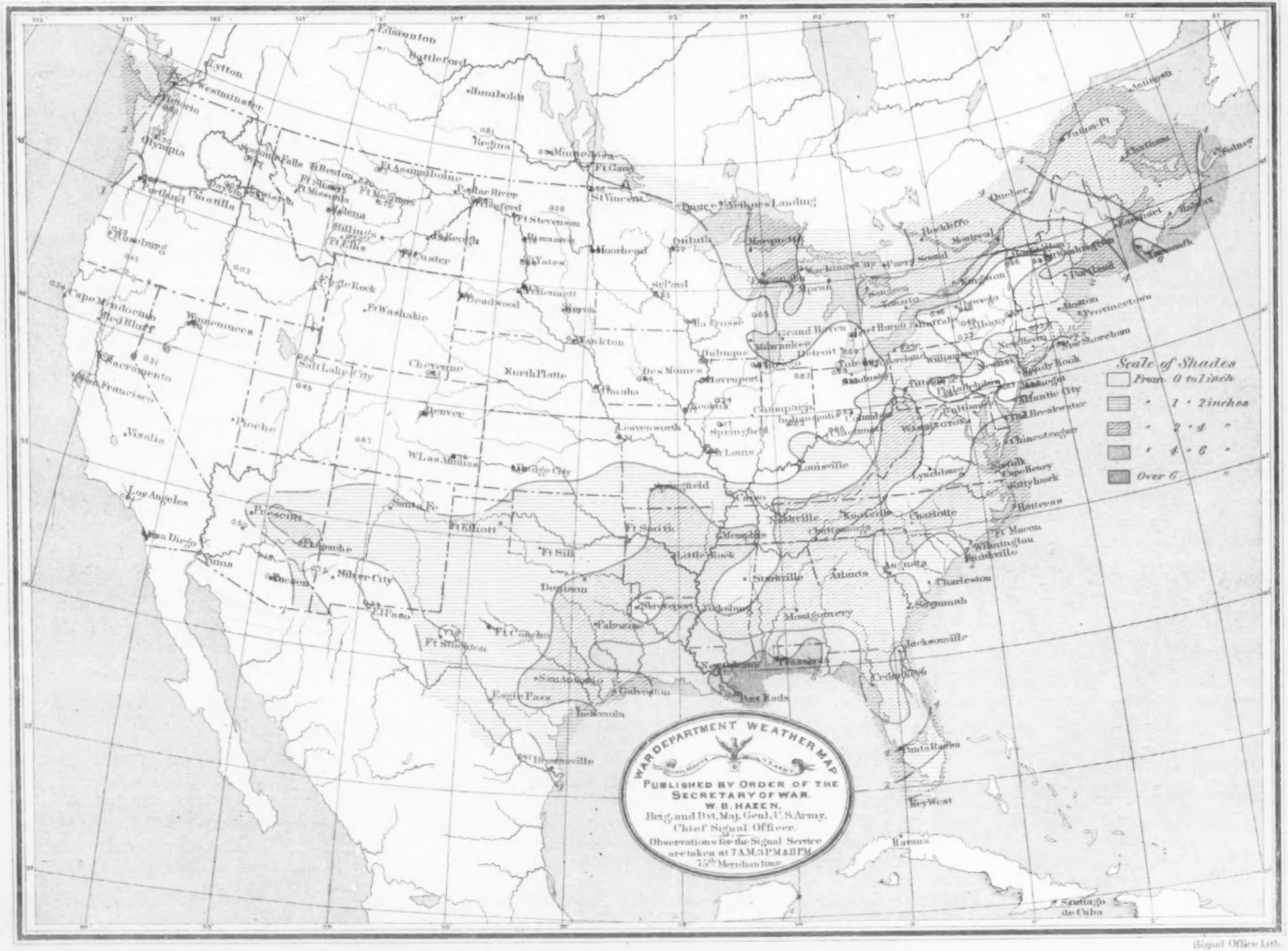

WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time.
Edmonton
Battleford
Humboldt
Qu'Appelle
Winnipeg
Duluth
Marquette
Quebec
Montreal
Portland
Halifax
Bismarck
Moorhead
St Paul
Deadwood
Ft Washakie
Ft Custer
Ft Yates
Ft Buford
Ft Stevenson
Ft Keogh
Ft Ellis
Ft Missoula
Ft Benton
Ft Shaw
Helena
Bismarck
Miles City
Glendive
Pierre
Yankton
Huron
Aberdeen
Minnedosa
Qu'Appelle
Battleford
Edmonton
Calgary
Banff
Kamloops
Victoria
Port Townsend
Seattle
Tacoma
Portland
Roseburg
Cape Mendocino
Red Bluff
San Francisco
Fresno
Visalia
Los Angeles
San Diego
Yuma
Prescott
Ft Apache
Silver City
El Paso
Ft Elliott
Santa Fe
Las Vegas
Trinidad
Pueblo
Denver
Cheyenne
North Platte
Salt Lake City
Ogden
Omaha
Grand Island
Kearney
Leavenworth
Topeka
Ft Riley
Ft Sill
Ft Gibson
Ft Smith
Dodge City
Wichita
Springfield
St Louis
Keokuk
Davenport
Des Moines
Dubuque
Milwaukee
Chicago
Grand Haven
Toledo
Detroit
Cleveland
Buffalo
Oswego
Albany
Boston
Provincetown
New York
Sandy Hook
Philadelphia
Atlantic City
Baltimore
Washington
Cincinnati
Columbus
Indianapolis
Louisville
Nashville
Knoxville
Chattanooga
Memphis
Little Rock
Shreveport
Vicksburg
Meridian
Montgomery
Atlanta
Augusta
Charleston
Savannah
Jacksonville
Tallahassee
Cedar Keys
Key West
Havana
Santiago de Cuba
Wilmington
Hatteras
Norfolk
Lynchburg
Chincoteague
Delaware Breakwater
Sandy Hook
Portland
Eastport
Father Pt
Anticosti
Rockliffe
Montreal
Kingston
Toronto
Saugeen
Port Stanley
Escanaba
Marquette
Duluth

Chart III. Precipitation, March, 1885.

Form 106 F.

Form 106 F

Chart III. Precipitation, March, 1885.

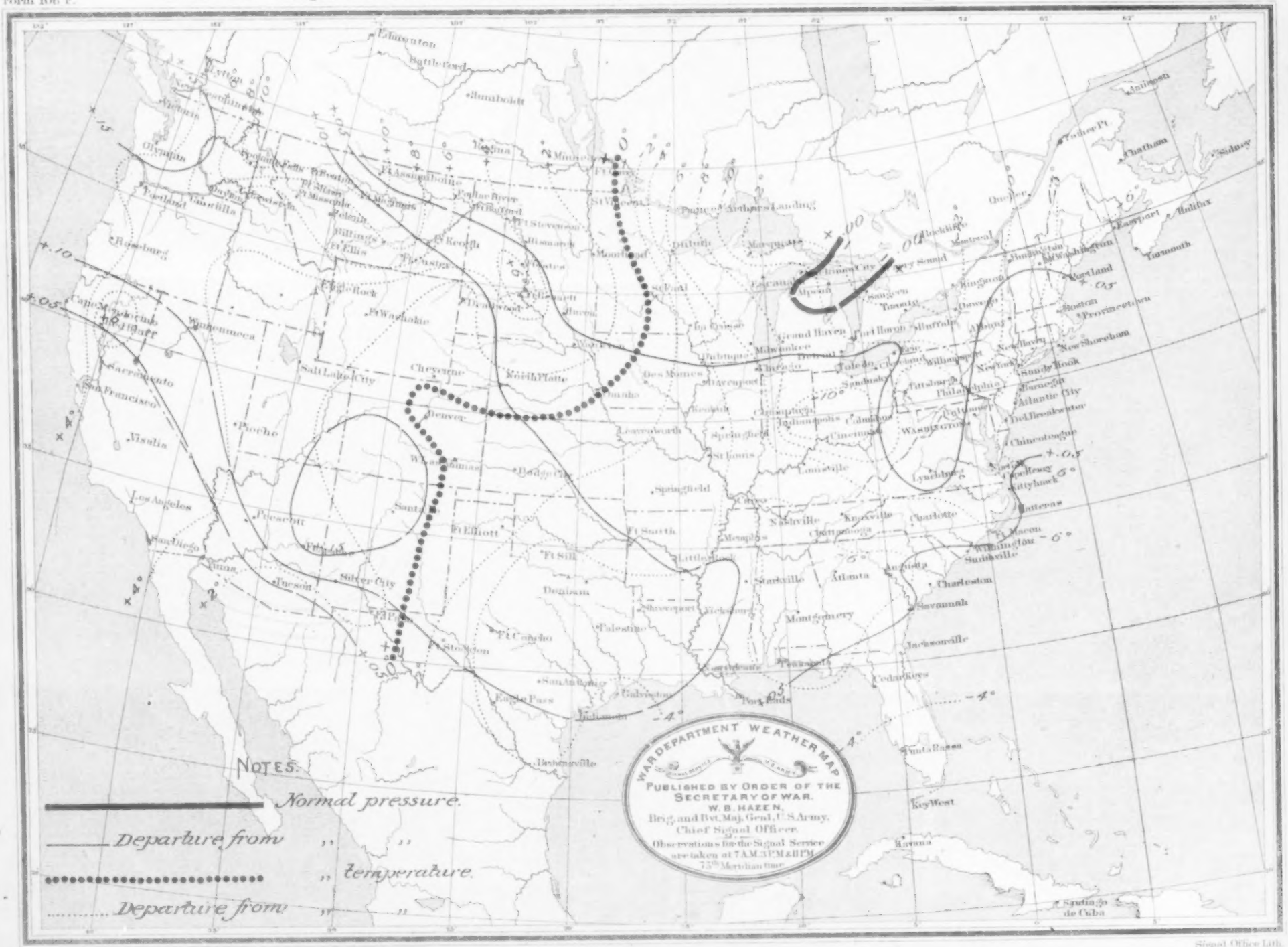

Scale of Shades
From 0 to 1 inch
" 1 " 2 inches
" 2 " 4 "
" 4 " 6 "
Over 6 "
WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
W. B. HAZEN,
Brig. and Bvt. Maj. Genl. U.S. Army,
Chief Signal Officer.
Observations for the Signal Service are taken at 7 A.M. 3 P.M. & 11 P.M. 75th Meridian time.

Signal Office Lith.

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. March, 1885.

Form 106 F.

Chart IV. Departures from Normal Atmospheric Pressure and Temperature. March, 1885.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Chief Signal Officer.
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NOTES.
Normal pressure.
Departure from " "
" temperature.
Departure from " "

Signal Office Lith.

Voluntary observers of the Signal Service, on land, from whom meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for March, 1885.

Observer and place of observation.

Anderson, Dr. W. W., Stateburg, S. C.
Altaffer, J. M., Independence, Kans.
Adams, Dr. O. H., Vineland, N. J.
Andrews, L., Southington, Conn.
Abbott, Dr. E. K., Salinas City, Cal.
Alexander, S., Birmingham, Mich.
Arents, Hiram, Oroville, Cal.
Bennett, Geo, Bandon, Oreg.
Beloit College, Beloit, Wis.
Bell, Joseph, Franklin, Pa.
Bowen, F. W., Humboldt, Iowa.
Brainerd, Dr. H. G., Independence, Iowa.
Baker, Dr. Henry B., Lansing, Mich.
Beall, Dr. R. L., Lenoir, N. C.
Brendel, Dr. Fred., Peoria, Ill.
Bentley, David, Princeton, Cal.
Bowman, Peter, Ruggles, Ohio.
Boerner, Prof. Chas. G., Vevay, Ind.
Bartlett, E. B., Vermillion, N. Y.
Baldwin, A. L., Bethel, Conn.
Bardsley, Jas. G., Nephi, Utah.
Briggs, John, Albany, Oreg.
Beans, Thos. J., Moorestown, N. J.
Betts, Prof. Arthur, Webster, Dak.
Breed, J. E., Embarras, Wis.
Buck, Mrs. R., Red Willow, Nebr.
Baker, Dr. L. J., Ottumwa, Iowa.
Boies, Lieut. A. H., Hudson, Mich.
Becker, Rev. W., Prairie du Chien, Wis.
Ballou, Dr. N. E., Sandwich, Ill.
Boyd, Joseph, Oskaloosa, Iowa.
Beebe, A., Manistique, Mich.
Beecher, Chas., Newport, Fla.
Bryant, A. F., Yutan, Nebr.
Blachly, C. P., Manhattan, Kans.
Barney, Wm., Stowe, Vt.
Blake, J. H., Christmas Prairie, Cal.
Beach, Rev. J. W., Norfolk, Conn.
Charbonnier, Prof. L. H., Athens, Ga.
Cook, S. A., Milledgeville, Ga.
Cotton, Dr. D. B., Portsmouth, Ohio.
Clark, A. C., Wausau, Wis.
Casey, Geo., Auburn, N. Y.
Crawford, E. A., Liberty Hill, La.
Curtiss, G. G., Fallston, Md.
Cornell University, Ithaca, N. Y.
Cocke, A. R., Indianola, Iowa.
Cutting, Hiram A., Lunenburg, Vt.
Crosier, Adam, Laconia, Ind.
Caulkins, John S., Thornville, Mich.
Clark, T. A., Weldon, N. C.
Crawford, D. F. G., Leetsdale, Pa.
Carleton College, Northfield, Minn.
Chandler, Dr. W. J., South Orange, N. J.
Cass, John J., Allison, Kans.
Chase, Pliny E., Haverford College, Pa.
Comstock, Prof. F. M., Le Roy, N. Y.
Cochran, Wm. P., Clay Centre, Kans.
Calhoun, P. B., Austin, Tenn.
Carpenter, Dr. W. B., Leavenworth, K.
Christ, Jacob, Franklin, Wis.
Cheney, Wm., Minneapolis, Minn.
Cox, Prof. T. E., Emmitsburg, Md.
Caffee, Wm. K., Carthage, Mo.
Collin, Prof. Alonzo, Mt. Vernon, Iowa.
Cooper, Dr. Geo. C., Manatee, Fla.
Couch, E. D., Contoocook, N. H.
Cleveland, Dr. G. H., Moorestown, Mich.
Cowgill, Miss S. P., Sterling, Kans.
Culver, G. E., Vermilion, Dak.
Clayton, H. H., Ann Arbor, Mich.
Corbin, F. E., Dudley, Mass.
Chubbs, Thos H., Post Mills, Vt.
Capen, F. S., Waterville, Me.
Coffin, Prof. S. J., Easton, Pa.
Cutler, J. L. Quitman, Ga.
Cole, Seward, Cahuenga, Cal.
Crowder, F. L., Elk Park, N. C.
Cutler, B. B., Heath, Mass.
Chapin, Adams, Poway, Cal.

Observer and place of observation.

Carter, Rev. Dr. W. H., Tallahassee, Fla.
Davis, Jacob, Rowe, Mass.
Dickinson, Jas. R., Guttenberg, Iowa.
Deming, H. D., Wellsboro, Pa.
Dozier, Wm., Mattoon, Ill.
Dewhurst, Rev. E., Voluntown, Conn.
Day, Theodore, Dyberry, Pa.
Dawson, Wm., Spiceland, Ind.
Dunton, Lieut. W. R., Dorset, Vt.
Dunlap, W. L., Tecumseh, Nebr.
Dow, Roswell, Sycamore, Ill.
Dudley, C. B. Altoona, Pa.
Doton, Hosea, Woodstock, Vt.
Dunlap, J. B., Charleston, Ill.
Dechant, Wm. H., Mahonoy Plane, Pa.
Eliason, W. A., Statesville, N. C.
Eckstein, Rev. M., Conception, Mo.
Ellis, John, Marquette, Nebr.
Ellsworth, W. W., Hartford, Conn.
Elliott, Rev. J. C., Swanwick, Ill.
Ewell, Dr. M. D., South Evanston, Ill.
Fernald, Prof. M. C., Orono, Me.
Ferris, B. F., Sunman, Ind.
Fouch, Dr. A., College City, Cal.
Foss, E. T., Hydesville, Cal.
Fox, F. E., Fall Brook, Cal.
Fuller, E. N., Tacoma, Wash. T.
Frick, Prof. J. H., Warrenton, Mo.
Friend, Chas. W., Carson City, Nev.
Gates, W. B., Burlington, Vt.
Grathwohl, John, Blooming Grove, Pa.
Gillingham, Milnor, Fallsington, Pa.
Gardiner, R. H. Gardiner, Me.
Gowey, H. D., North Lewisburg, Ohio.
Gibson, John H., Salina, Kans.
Green, Dr. Jesse C., West Chester, Pa.
Gerrish, S. H., Sacramento, Cal.
Gray, J. W., Stockham, Nebr.
Goodwin, Wm., North Colebrook, Conn.
Geddings, Dr. W. H., Aiken, S. C.
Gregory, J. W., Sherlock, Kans.
Gordon, Dr. G. G., Swartz Creek, Mich.
Gray, F. R., Yates Centre, Kans.
Gillingham, W., Accotink, Va.
Grymes, A. J., Blacksburg, Va.
Garlick, Rev. Dr. J. R., Bruington, Va.
Gray, Capt. A. W., Kenewick, Wash. T.
Heath, E. R., Wyandotte, Kans.
Horn, Dr. H. B., Atchison, Kans.
Hiram College, Hiram, Ohio.
Harvard College Observatory, Cambridge, Mass.
Hammitt, John W., College Hill, Ohio.
Heaton, Isaac E., Fremont, Nebr.
Helm, Thos. B., Logansport, Ind
Hoskinson, R. M., Bainbridge Island, Wash Ter.
Hunter, Dr. T. C., Wabash, Ind.
Haywood, John, Westerville, Ohio.
Hyde, G. A., Cleveland, Ohio.
Hassler, B. K., Chambersburg, Pa.
Hartzler, J. A., Mottville, Mich.
Hall, J. B., Worcester, Mass.
Hager, Mrs. L. G., Terre Haute, Ind.
Howe, Prof. J. L., Richmond, Ky.
Hoyt, F. C., Easton, Pa.
Houghton Farm Experiment Station, Mountainville, N. Y.
Heatwole, L. J., Dale Enterprise, Va.
Heacock, J. L., Quakertown, Pa.
Hazen, Rev. A., Deerfield, Mass.
Harris, W. C., Dover, N. J.
Hickman, E. A., Independence, Mo.
Harper, Geo. W., Cincinnati, Ohio.
Hodge, Rev., F. B., Wilkes Barre, Pa.
Housekeeper, H. S., S Bethlehem, Pa.
Humphrey, Dr. I., Fairbury, Nebr.
Howland, Mrs. W. P., Jefferson, Ohio.
James, John W., Marengo, Ill.
Jones, Dr. E U., Taunton, Mass.

Observer and place of observation.

Jordan, Dr. M. D. L., Milan, Tenn.
Jones, Ira B., Neillsville, Wis.
Knapp, J. G., Limona, Fla.
Keese, G. Pomeroy, Cooperstown, N. Y.
Kuhne, F. W., Fort Wayne, Ind.
Keeler, W. F., Mayport, Fla.
Kirkwood, E., Mauzy, Ind.
Kent, Miss E., Phillipsburg, N. J.
Kauffman, H. W., Dillingersville, Pa.
King, W. R., Yellow Springs, Ohio.
Lueps, Miss Johanna, Manitowoc, Wis.
Lincoln, A. T., Marion, Va.
Loomis, J. C., Jeffersonville, Ind.
Lay, Dr. F. H., Pueblo, Colo.
Lucas, Dr. G. L., Albion, Idaho.
Luther, S. M., Garrettsville, Ohio.
Ladshaw, Geo. E., Pacolet, S. C.
Loud, Prof F. H., Colorado Springs, Colo.
Lovewell, Prof. J. T., Topeka, Kans.
McDonogh Institute, McDonogh, Md.
McCready, Miss L. A., Fort Madison, Iowa.
Moore, C. R., Bird's Nest, Va.
Munn, A. M., Kalamazoo, Mich.
Metcalf, Dr. John G., Mendon, Mass.
Micklem, J. Howard, Variety Mills, Va.
Meehan, Thos., Germantown, Pa.
Moore, Nathan, Grampian Hills, Pa.
Mikesell, Thos., Wauseon, Ohio.
McPherson, Wm., San Rafael, Cal.
McClintock, F., West Union, Iowa.
Marshall, G., Cresco, Iowa.
Mitchell, Dr. D. W., Harrisville, Mich.
Miller, H. D., Drifton, Pa.
McNeill, M., Princeton, N. J.
Neal, Dr. J. C., Archer, Fla.
Newbegin, John D., Anna, Ill.
Nelson, P. P., Northport, Mich.
Newcomb, G. S., Westborough, Mass.
Nourse, H. D., Washington, D. C.
Noll, A. B., Somerville, N. J.
Nickerson, W. W., Klamath Agency, Oreg.
Nicholson, Dr. A. W., Boyne, Mich.
Nordberg, A., Richardton, Dak.
Osborn, Dr. Thos C., Cleburne, Tex.
Olds, H. D., Cedar Rapids, Iowa.
Owsley, Dr. J. B., Jacksonborough, O.
Otis, H. G., Washington, Pa.
Pearce, Thomas, Eola, Oreg.
Pierson, Rev. J., Ionia, Mich.
Powrie, W., Sussex, Wis.
Parrish, Geo. W., Ellensburg, Wash. T.
Patterson, Wm., Salem, N. J.
Partrick, J. M., North Volney, N. Y.
Purdue University, La Fayette, Ind.
Pettersén, Dr. F., Comfort, Tex.
Pritchett, H. C., Huntsville, Tex.
Prosser, Chas. S., Ithaca, N. Y.
Remington, C. V. S., Fall River, Mass.
Robertson, T. D., Rockford, Ill.
Rogers, F. M., Luling, La.
Renfrew, H. N., Wilton Center, Ill.
Rodman, Thos. R., New Bedford, Mass.
Rockwood, Prof. C. G., Princeton, N. J.
Rerick, R. H., La Grange, Ind.
Rotch, A. L., Blue Hill, Mass.
Russell, Geo. W., Wellsburg, W. Va.
Runge, C., New Ulm, Tex.
Rivers, C. M., Oswego, Kans.
Shaw, J., Chester, Minn.
Shriver, E. T., Cumberland, Md.
Seltz, Chas., De Soto, Nebr.
Scott, Thos. G., Forsyth, Ga.
Stucky, Dr. C. T., Helvetia, W. Va.
Stern, Jacob T., Logan, Iowa.
Slade, Elisha, Somerset, Mass.
Slenker, Mrs. E. D., Snowville, Va.
Scribner, H. F. J., Strafford, Vt.
Shriver, Howard, Wytheville, Va.
Smith, H. D., Monticello, Iowa.

Observer and place of observation.

Shahan, Chas. C., Edgington, Ill.
Safford, A. T., Williamstown, Mass.
Sherman, W. B., Manchester, Iowa.
Smith, Rev. D. W., Troy, Pa.
Samostz, Oscar, Austin, Tex.
Staudenmayer, Dr. L. R., Lincolnton, N. C.
Snell, Miss S. C., Amherst, Mass.
Shaw, E., Maud, Kans.
Sim, John R., Summit, Va.
Sommerville, W. B., Birmingham, Ala.
Snow, Prof. F. H., Lawrence, Kans.
Shepard, E. M., Springfield, Mo.
Starr, Prof. F., Cedar Rapids, Iowa.
Sadler, Prof. H. E., Emporia, Kans.
Spilman, J. J., Pierce City, Mo.
Stone, W. E., Amherst, Mass.
Sargent, J. B., Leicester, Mass.
Swezey, Prof. G. D., Crete, Nebr.
Sanderson, H. S., Clarksville, Tex.
St. Auburn, Wm. T., Tower House, Cal.
Trembley, Dr. J. B., Oakland, Cal.
Todd, Prof. David P., Amherst, Mass.
Teele, Rev. A. K., Milton, Mass.
Truman, Geo. S., Genoa, Nebr.
Turnbo, Silas C., Pro Tem, Mo.
Tillinghast, C. B., Albany, N. Y.
Turner, Ernest, Point Pleasant, La.
Tyrrel, A. C., Madison, Nebr.
Treimer, Geo., Round Grove, Iowa.
Thompson, R. J., Tiffin, Ohio.
Upton, Prof. W., Providence, R. I.
Van Inwegen, C. F., Port Jervis, N. Y.
Voegeli, Adolphus, Des Moines, Iowa.
Venable, Prof. F. P., Chapel Hill, N. C.
Vermillion, W. W., Curryville, Mo.
Washburne Observatory, Madison, Wis.
Wild, Rev. E. P., Newport, Vt.
Williams, Rev. C. F., Ashwood, Tenn.
Wing, Miss M. E., Charlotte, Vt.
West, Silas, Cornish, Me.
Went, E. C., Frankfort, Ky.
Wylie, Wm., Mount Forest, Canada.
Walton, J. P., Muscatine, Iowa.
Wait, S. E., Traverse City, Mich.
Woodstock College, Woodstock, Md.
Wolfe, John H., Wellington, Kans.
West, Dr. Jos. O., Princeton, Mass.
Washington Aqueduct. Receiving Reservoir, D. C; Distributing "; Great Falls Reservoir, Md; Rock Creek Bridge, D. C.
Winipiseogee Lake Cotton and Woolen Manufacturing Co. Weir's Bridge, N. H.; Wolfborough, N. H.; Lake Village, N. H.; Bristol, N. H.; Belmont, N. H.; Ashland, N. H.
Willis, O. R., A. M., Ph. D., White Plains, N. Y.
Williams, Dr. A. C., Elk Falls, Kans.
Wigg, Dr. Geo., East Portland, Oreg.
Watters, Dr. Jas., Holton, Kans.
Woods, Mrs. Dr. A. G., Maynard, Iowa.
Wetmore, E. L Tucson, Ariz.
Wright, J. W. A., Greensboro, Ala.
Watson, Dr. S. T., Nayatt Point, R. I.
Wadsworth, Dr. J. L. R., Collinsville, Ill.
Watson, Evan, Fort Scott, Kans.
Widman, Rev. C. M., Grand Coteau, La.
Wistrom, M. F., Harvard, Nebr.
Winn, Rev. T. S., Green Springs, Ala.
Ward, J. B., Guilford, Ind.
Whitney, Chas. E., Humphrey, N. Y.
Whitmore, J. E., Gallinas Springs, N. Mex
Whittington, G., Mount Ida, Ark.
Yetter, Wm. G., Catawissa, Pa.
Yates, T. P., Factoryville, N. Y.
Young, Geo. R., Penn Yan, N. Y.
Zimmerman, F. C., Bunker Hill, Ill.

Military posts from which meteorological reports were received, through the Surgeon General of the Army, in time to be used in the preparation of the Monthly Weather Review for March, 1885.

Alcatraz Island, Cal.
Angel Island, Cal.
Assinaboine, Fort, Mont.
A. Lincoln, Fort, Dak.
Benicia Barracks, Cal.
Bidwell, Fort, Cal.
Brady, Fort, Mich.
Bridger, Fort, Wyo.
Brown, Fort, Tex.
Barrancas, Fort, Fla.
Concho, Fort, Tex.
Columbus, Fort, N. Y.
David's Island, N. Y. H.
Ellis, Fort, Mont.
Fred Steele, Fort, Wyo.
Hamilton, Fort, N. Y.
Klamath, Fort, Oreg.
Keogh, Fort, Mont.
Lyon, Fort, Colo.
Lewis, Fort, Colo.
Mason, Fort, Cal.
Madison Barracks, N. Y.
McDermitt, Fort, Nev.
Monroe, Fort, Va.
McHenry, Fort, Md.
Mount Vernon B'ks, Ala.
McDowell, Fort, Ariz.
Meade, Fort, Dak.
Niagara, Fort, N. Y.
Presidio of San Francisco, Cal.
Plattsburg Barracks, N. Y.
Pembina, Fort, Dak.
Preble, Fort, Me.
Randall, Fort, Dak.
Reno, Fort, Ind. T.
Robinson, Fort, Nebr.
Snelling, Fort, Minn.
Saint Augustine, Fla.
Sully, Fort, Dak.
Sisseton, Fort. Dak.
Shaw, Fort, Mont.
Totten, Fort, Dak.
Townsend, Fort, Wash. T
Union, Fort. N. Mex.
West Point M. A., N. Y.
Yates, Fort, Dak.

State weather services from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for March, 1885.

Alabama State Weather Service, under direction of Prof. P. H. Mell, Jr., Auburn, Alabama.
Georgia State Weather Service, under direction of Hon. J. T. Henderson, Atlanta, Ga.
Missouri State Weather Service, under direction of Prof. Francis E. Nipher, Saint Louis, Mo.
Nebraska State Weather Service, under direction of Prof. Goodwin D. Swezey, Crete, Nebraska.
Indiana Volunteer Weather Service, under direction of Prof. W. H. Ragan, Greencastle, Indiana.
Indiana State Weather Service, under direction of Prof. H. A. Huston, La Fayette, Indiana.
Ohio State Weather Service, under direction of Prof. T. C. Mendenhall, Columbus, Ohio.
Tennessee State Weather Service, under direction of Hon. A. J. McWhirter, Nashville, Tennessee.
Minnesota State Weather Service, under direction of Prof. W. W. Payne, Northfield, Minnesota.
Illinois State Weather Service, under direction of Mr. C. F. Mills, Springfield, Ill.
New England Meteorological Society: Prof. Winslow Upton, of Providence, director; Mr. W. M. Davis, of Cambridge, secretary.
Louisiana State Weather Service, under direction of Robert S. Day, New Orleans, La.
Data have also been used from meteorological records of the Central Pacific and Southern Pacific railway companies.

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do.	107 G,	do.	2.00
do.	107 H,	do.	2.50
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